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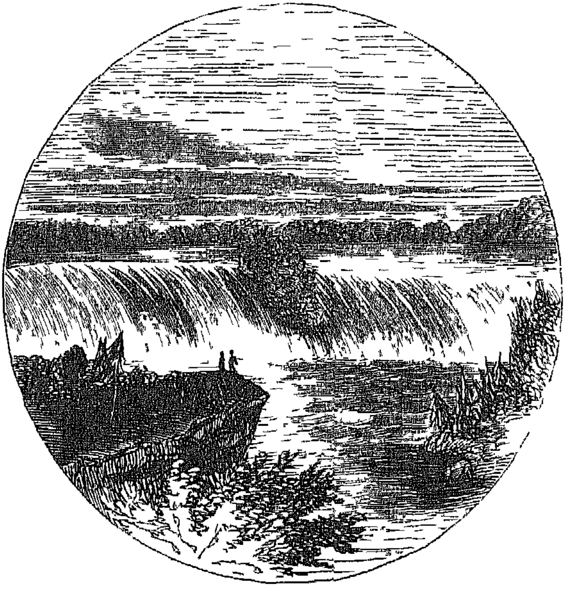
Wonderful Things.

WONDERFUL WATERFALLS.



FALLS OF NIAGARA

THE waterfall is rather of the beautiful than the wonderful. Its elements, such as towering rocks, deep gorges, green valleys, and the sheets of foam which the descending flood produces, are all things rather of beauty than wonder, and as materials in the landscape, eminently picturesque. There are some few waterfalls, however, which, from the mass of descending water, the breadth and depth of *the current*, or *the height and rapidity of the fall itself*, deserve to be classed in the catalogue of the wonderful.

First in the list of wonderful waterfalls is that of Niagara, renowned all over the world for its majesty, its magnitude and its power, and described by travellers as the sublimest object on earth. The ocean is often more varied in its grandeur, the giant mountains of the Andes and Himalaya more imposing in their solitude, but no single spectacle is at once so striking and wonderful as the descent of this sea-like flood, the overplus of four extensive American lakes. From Lake Erie to Lake Ontario the river Niagara has a course of about thirty-three miles; and at the fall the width of the river is three-quarters of a mile. The fall itself is divided into two unequal portions by the intervention of a small patch of rock, called Goat Island, which presents a façade 1000 feet in breadth; thus in a strict sense there are two falls; the one on the British side of the river, called from its shape, the Horse-shoe Fall, is about 2100 feet broad, and 149 feet 9 inches high. The other, or American Fall, is 1140 feet broad and 864 feet high. The British, or Horse-shoe Fall, is superior in grandeur to the other: the water passing over with such rapidity that it forms a curved sheet which strikes the stream below at the distance of fifty feet from the base, and some travellers have ventured between the descending flood and the rock itself. The quantity of water rolling over these falls is estimated at 670,250 tons per minute.

Captain Basil Hall compares the sound of its waters to the ceaseless, rumbling, deep monotonous sounds of a vast mill. Dr. Read says, "It is not like thunder, nor like the sea, nor like anything he had anywhere else heard. There is no roar, no rattle, nothing sharp or angry in its tones: it is deep, awful, One." A visit to the falls by Mr. A. N. Gould, he thus describes —"My attention had been kept alive, and I was all awake to the sound of the cataract; but though within a few miles, I heard nothing. A cloud hanging steadily over the forest, was pointed out to me as the 'spray clouds'; at length we drove up to Forsyth's Hotel, and the mighty Niagara came in full view. My first impression was that of disappointment, * * * but while I mused, I began to take in the grandeur of the scene. The fact is, that the first view of Niagara is a bad one: and the eye, in this situation, can comprehend but a *small* part of the wonderful scene; you look *down* upon the cataract, instead of *up* to it; the confined channel, and the depth of it, prevent the astounding roar which was anticipated, and at the same time, the eye wanders midway between the water and the cloud formed by the spray, which it sees not. After a quarter of an hour's gaze, I felt a kind of fascination—a desire to find myself gliding into eternity in the centre of the grand fall, over which the bright green water appears to glide like oil, without the least commotion. I approached nearly to the edge of the 'Table Rock,' and looked down into the abyss. A lady from Devonshire had just returned from the spot. I was informed she had approached its very edge, and sat with her feet over the edge,—an awful and dangerous proceeding. Having viewed the spot, and made myself acquainted with some of its localities, I returned to the hotel, which is admirably situated for the view; from my chamber window I looked directly upon it, and the first night I could find but little sleep from the noise. Every view I took increased my admiration; and I began to think that the other falls I had seen were, in comparison, like runs from kettle spouts on hot plates. I remained in this interesting neighbourhood for five days and saw the fall from almost every point of view. From its extent and the angular line it forms, the eye cannot embrace it all at once: and, probably, from this cause it is that no drawing has ever yet done justice to it. The grandest view, in my opinion, is at the bottom, and close to it on the British side, where it is awful to look up through the spray at the immense body as it comes pouring over, deafening you with its roar; the lighter spray, at a considerable distance, hangs poised in the air like an eternal cloud. The next best view is on the American side, to reach which you cross in a crazy ferry boat; the passage is safe enough but the current is strongly agitated. Its depth, as near to the falls as can be approached, is from 180 to 200 feet. The water, as it passes over the rock, where it is not whipped into foam, is a most beautiful sea-green, and it is the same at the bottom of the falls. The foam, which floats away in large bodies, feels and looks like salt water after a storm: it has a strong fishy smell. The river, at the ferry, is 1170 feet wide. There is a great quantity of fish, particularly sturgeon and bass, as well as eels; the latter crept up against the rock under the falls, as if desirous of finding some mode of surmounting the heights. Some of the visitors go *under* the falls, an undertaking more curious than pleasant. It is described as like being under a heavy shower-bath, with a tremendous whirlwind driving your breath from you, and causing a peculiarly unpleasant sensation at the chest; the footing over the *débris* being slippery, the darkness barely visible, and the roar almost deafening. In the passage you kick against eels, many of them unwilling to move, even when touched: they appear to be endeavouring to work their way up the streams."

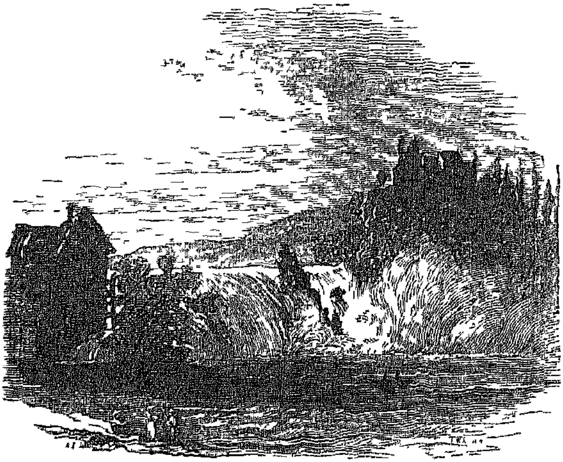
A dislocation of the rocks, which occurred in 1818, caused by the cutting away of the foundation by the erosive action of the water, has increased the difficulty of entering the chasm under the fall. In 1828 a similar rupture took place, and obstructed the passage still more. In spite of the real hazard so produced several visitors of late years have made the attempt, and none with more success than Miss Martineau, who describes the undertaking in her work on America. She says, "A hurricane blows up from the cauldron; a deluge drives at you from all parts; and the noise of both wind and waters, reverberated from the cavern, is inconceivable. Our path was sometimes a wet ledge of rock, first broad enough to allow one person at a time to creep along; in other places we walked over heaps of fragments, both slippery and unstable. If all had been dry and quiet, I might have thought this path above the boiling basin dangerous, and have trembled to pass it; but, amidst the hubbub of gusts and floods, it appeared so firm a footing that I had no fear of slipping into the cauldron. From the moment I perceived we were actually behind the cataract, and not in a mere cloud of spray, the enjoyment was intense. I not only saw the watery curtain before me like tempest-driven snow, but, by momentary glances, could see the crystal roof of this most wonderful of Nature's palaces. The precise point where the flood quitted the rock, was marked by a gush of silvery light, which of course was brighter where the waters were shooting forward, than below where they fell perpendicularly."

Several fatal accidents have happened at these falls. A tradition tells of an Indian, who, getting unwittingly within reach of the rapids, and finding escape impossible, sat singing in his canoe till it glided over the fall, bearing him, in a single moment, and without a single pain, to eternity. Chateaubriand almost lost his life here, through his horse getting frightened by a snake, and was saved only by the animal suddenly perceiving the new danger, and springing by a pirouette ten feet away from the abyss. The cutting away of the rock is so rapid that the fall recedes at the rate of about fifty feet in forty years, so that for the falls to recede to Lake Erie, a distance of twenty-five miles, will require a period of 35,000 years, when the lake will be drained of its contents, and the country (if preserving its present features) will be submerged and partially destroyed by the inundanon.

The cataracts of America are most of them prominent for magnitude and sublimity. After that of Niagara those of the St. Lawrence are the most remarkable. The Coteau de Luc, the Cedars, the Split Rock, and the Cascades, are all of them fine falls, full of romantic beauty, which occur in succession for about nine miles above Montreal and the junction of the Ottawa. The Rapids of St. Anne have been long celebrated from a very touching practice of the boatmen, who repair to a small island, on which is a church dedicated to St. Anne, the guardian spirit of voyagers, and ask her blessing and protection before they attempt to pass the rapids. Moore has made this the subject of one of the finest songs ever written—

"Faintly as tolls the evening chime,
Our voices keep tune and our oars keep time;
Soon as the woods on shore look dim,
We'll sing at St. Anne's our parting hymn.
Row, brothers, row, the stream runs fast,
The rapids are near, and the daylight's past."

Of American cataracts, the Katerskill Falls are most celebrated for picturesque beauty. The waters which supply these cascades flow from the small lakes in the Catskill Mountains, on the west bank of the river Hudson. The upper cascade falls 175 feet; and a few rods below, the second pours its waters over a precipice eighty feet deep, passing into a lovely ravine, the banks of which rise abruptly on each side to the height of 1000 to 1500 feet.



THE FALLS OF THE RHINE.

The Rhine is one of the finest rivers of Europe. It rises in the Rhetian Alps, and pursues a winding course through 830 miles of the most lovely scenery, consisting of fertile wheat lands, grassy meadows, dark, shaggy, and primitive forests, and shelving hills, clothed to the summits with the graceful vine. Of the cultivated lands through which it flows, the vineyards are by far most numerous. The hills rise up in bold and rounded masses, flanked from their feet to their sun-lighted crowns, with the rich masses of purple grapes and light-green foliage of the vines, and dotted here and there by the white cottages of the German peasantry, sprinkled on the hill-sides like snow-flakes. Under the azure blue sky and delicious climate of an European summer the voyage up the Rhine is one of the most enchanting that can be undertaken. The pellucid waters reflect every white cloudlet, and in the sweeping bends of the river the stillness is sometimes profound; the water lies in a glassy sheet like a burnished mirror, as the sunbeams dart and tremble like vapours above it. The magnificent forests, the exuberance of vegetation in the cultivated districts, and the endless succession of brilliant flowers which cluster on the banks; and the swift receding rafts descending with the current, with the picturesque castles, cathedrals, villages, and costumes, which appear on every hand, form a delightful assemblage of objects full of interest, novelty, and instruction.

Discharging annually thirteen times as much water as the Thames; and having a basin measuring not less than 70,000 square miles, the movements and characteristics of the Rhine are upon a scale of grandeur which surpasses most European rivers, with the exception of the Danube, the Dnieper, the Don, and the Volga. The Rhine is swift in its course, though it has only a fall of four feet from Schaffhausen to Strasbourg; and of two feet between Strasbourg and Schenckenschautz.

The fall of Schaffhausen is one of extreme beauty and majesty. From a sharp ledge, only seventy feet above the gorge below, a mass of waters, 450 feet broad, plunge with a silvery light and a rich, half-organ-like, half rumbling tone. The lovely scenery around—the blue sky above—and the purity and clearness of the water, render the scene highly attractive, and fill the mind with wonder. Down below, the river-craft move on the stream—far above, the vineyards lie purpling in the sun, and around on all hands, are the tokens and associations of old-world life, in castles, fortresses, and ruined abbeys, while these again are fringed by the living pictures of to-day, the men and women and the harvests, and all the ties that link us to the present.

THE FALLS OF TERNI,

Which occur in the river Velino, are, however, the finest in Europe. Although massive and sublime, this "hell of waters," as Byron calls them, is of artificial construction. A channel was dug by the consul, Curius Dentatus, in the year 247, B.C., to convey the waters to the precipice; but having become filled by a deposition of calcareous matter, it was re-opened by Pope Paul IV, and at the same time, many of its features of modern beauty were added. "I saw," says Byron, "the Cascata del

Marmore of Terni, twice at different periods; one from the summit of the precipice, and again, from the valley below. The lower view is far to be preferred, if the traveller has time for one only: but in any point of view, either from above or below, it is worth all the cascades and torrents of Switzerland put together." Mr. Reade, in his poem of "Italy," gives a vivid picture of these falls.

"A gorge cleft through the mighty mountain's heart,
Volcanic throes within her do we hear?
Or pent-up winds, or earth's spasmodic start?
No—'tis the rushing Terni's wild career!
Or, where yon clouds, like shrouded giants, rear
Their shapes in azure distance, while the swell
Of the strife, gathering on the startled ear,
The sounds of their eternal conflict tell:
Loud as o'er distant storms the thunder's sink in knell.

Lo! hurrying onwards, wreathed in mist and foam,
His robes caught upward in *delirious flight*,
Velino rushes from his mountain home,
All beautiful, but terrible in might;
One desperate bound from yonder cloud-capped height,
Flushingly hurls him from his unseen throne,
Shot like a flying minister of light;
High o'er the chaos wreck his crown is shown,
Of rainbow glories faded, still upheld alone.

Hovering above him in his ruin there,
Tortur'd and madden'd in the abyss he lies,
Yet on his shivering forehead he doth wear
The flickering hues and light of his lost skies;
Behold in eddying wreaths how o'er him rise
The smoke, the reek, the steam, of his wild breath,
Wrung from the efforts of his agonies:
How bend they darkening 'gainst the mountain's heath,
A horror to the scene, that war of life and death!

THE FALLS OF TROLHETTA,

In Sweden, are perhaps the next in point of grandeur to those of the Rhine. The entire fall is indeed the greatest in Europe, considering the mass of water precipitated; and the height is 130 feet, which is sufficient to give it the necessary traits of sublimity. The falls occur on the river Gotha, which is the only outlet of a large lake of one hundred miles in length, and fifty in breadth, and which receives no less than twenty-four separate streams, all of them the drainage of the snow-clad mountains. Towards the falls, the river glides along with great rapidity, and as smoothly as glass; till, as it approaches the verge of the precipice, it bends slightly into a convex surface, and then darts over the edge in one broad sheet, which is broken by some jutting rocks, after a descent of forty feet. At this point, the spectacle assumes its grandest form; the waters leap from rock to rock, like huge gambolling creatures endowed with life and hilarity: now they heave up like monstrous yellow snakes, all writhing together in painful contortions, and spitting from a thousand jaws great sheets of roaring foam; now they boil and eddy round like water-sprites all mad with sport, until, as the flood boils on, the whole mingle together, and become whiter and whiter, till all is fretted into a sea of snowy froth; and a light spray, variegated with all the colours of the rainbow, rises up to the clouds, and hides the abyss into which the torrent dashes. Now and then a gust drives this spray aside, and for a moment, the eye catches a glimpse of the black gulf below, the depth of which it is unable to fathom.

In Wales and Scotland, cascades are numerous, but there are few of sufficient magnitude to be worthy of the name of cataracts. The most remarkable in Scotland are the upper and lower Falls of Foyers, near Loch Ness. At the upper fall, the river precipitates itself at three leaps, down as many precipices, the united depth of which is about 200 feet; but at the lower, it makes a descent at once of 212 feet, and, after heavy rains, exhibits a grand appearance. In Wales, a fall of considerable note, is that known as

THE GREAT FALL OF THE PURTHEN,

" Which," says Mr. Roscoe, "is called in the language of that country, Ysgwd Einon Gam,—lame Einon's waterfall—from the peculiarity of the situation, is not perceived or heard till the wanderer's foot has approached near to the high and rugged crag that beetles over the dark waters beneath. The effect is greatly heightened by the seclusion of the woody glen into which it unexpectedly opens upon the view, and the quiet path towards it, through the green meadows of the valley. A perpendicular cliff rears its bald, frowning brow right in front of the cascade, like an eternal watcher of its ceaseless fall. On the right, and with an aspect less rugged and high, rises another cliff, as if in companionship with its gigantic neighbour; between the latter and the opposite rocks, the river pours its rolling tide in one sheet of bright foaming water, to the distance of eighty feet. At the bottom of the taller cliff, there is a profuse vegetation and some luxuriant trees; but the sides of the lesser are completely clothed with verdure, and richly-coloured and delicately-tinted foliage. On the top, in majestic triumph and ineffable dignity, a single oak throws its broad arms over the falling waters, which, from its size and moss-covered trunk, must have been the associate of the stern cliff for many generations past.

SCALE FORCE,

In Cumberland, is situated in the heart of the lovely lake country, and though not a fall of great magnitude, merits notice here from its proximity, and for the ease with which the townsman may, by the aid of railway conveyance, visit one of the most beautiful and wonderful spots in Great Britain. About a mile and a-half from Buttermere, toward the west, is the cataract, which issues from the lake called Crommock Water, under Blea Crag,—this is a very rugged rock rising in successive tiers, like so many walls of ruined castles. On reaching the spot, the roaring of the fall is heard, but the cause is not visible. After scaling a wall, and descending a few paces, a terrific scene presents itself. Yawning rocks open into a frightful chasm, extending to a great depth into the mountain. Should the tourist possess sufficient courage to climb this awful cavity, over the fragments of rock, he will soon come to a cascade of about fifteen feet in height; but to reach Scale Force, further labour is necessary. Ascending to the side of the cascade, the visitor enters a long passage covered with fragments of rock, and bounded on each side by natural walls, covered with moss, fern, and shrubs. Above, large trees grow from fissures of the rock, and spread around a gloom which well assorts with the character of the scene. At the farther end of this passage is another perpendicular wall, over which rushes a large body of water into a gulley 180 feet deep. It falls in an unbroken sheet on to a heap of *debris*, from which it bounds away again with tremendous violence and deafening noise. When heavy rains set in, the grandeur and tumult is increased, and the mountain shakes with the continued roar of the plunging flood.

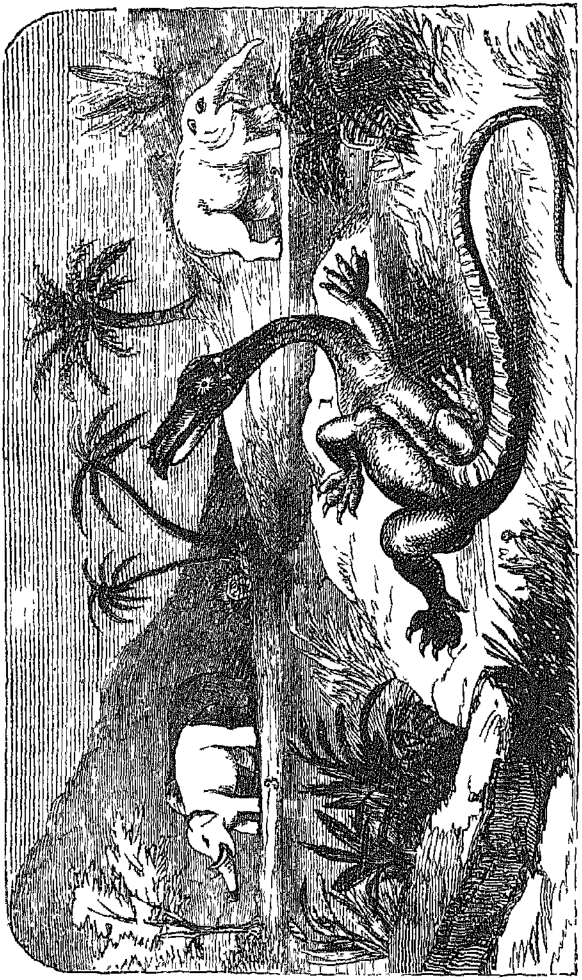
WONDERFUL FOSSIL ANIMALS.

In the dim ages of geological history, the earth was at divers times peopled with strange moving forms of types bearing few analogies to those now existing, and even in their own time standing far apart from the created forms around them. In fact, Geology presents us with a striking series of individualities, which may, it is true, be made to assimilate with other forms of being, but which, nevertheless, embody so many unique features as to claim distinct consideration from those interested in their history. Wonder, more than any feeling, takes possession of the mind in contemplating these forms, even before curiosity; because when strange forms and huge shapes break suddenly upon us, the powers of inquiry are for a time paralysed, and it is so pre-eminently in the first interviews we hold with the wonderful creatures of the pre-adamite world.

THE IGAUNODON

Is one of the earliest of those which appear upon the scene of wonders. Previous to its birth, but few of the higher forms of animal life had been produced, and it came upon the world in an age of great reptiles. A lizard-shaped reptile now inhabiting South America, and known as the Igauna, is that from which the fossil reptile derives its name. The igauna is an herbivorous reptile, living chiefly on trees and feeding on vegetable substances: it takes to the water when alarmed, and escapes its enemies by swimming. The size of the animal is seldom equal to five feet. The fossil igaunodon bears a close analogy to this modern reptile in its anatomical structure; but its magnitude must have been enormous, and more than realizing the dimensions of the dragon of fable. Its thigh bone exceeded in bulk that of the largest elephant, and was between four and five feet in length. Carefully comparing the bones of the igaunodon with those of the igauna of the present day, and taking an average from eight separate parts of the skeleton, Dr. Mantell deduced the following measurements :—

Length from the snout to the extremity of the tail	70 feet
Length of the tail	52½ feet
Circumference of the body	14½ feet.



1. The Igaunodon. 2. The Dinotherium. 3. The Mastodon.

Shaped after the fashion of a crocodile, this creature lived in the muddy estuaries of rivers, where the smaller tribes of lizards, and occasionally one of the larger reptiles there abounding, became its easy prey. With extraordinary muscular power and a brute resistance in harmony with its low place in the scale of creation, it overcame all obstacles to its progress, and seldom engaged in combat but it acquired the mastery, and made its foe subservient to its own appetite.

THE PTERODACTYLE

Is another creature of the same oolotic system. It is even more remarkable than the one just described, inasmuch as it combines the features of the bird, the reptile, and the fish. It had the head of a bird, and the parts of the four extremities, which correspond to the little fingers of man, were wonderfully elongated and covered with a leathery membrane, which extended to the hind toes, thus enabling it to pursue its prey after the manner of a gigantic bat. Dr. Buckland believes that it could swim with as much facility as it could fly, and that, like the fiend of Milton, it was qualified for all services, and fit to do battle in either of the elements—

> O'er bog, or steep, through straight, rough, dense, or rare,
> With head, hands, wings, or feet pursues his way,
> And swims, or sinks, or wades, or creeps, or flies.
>
> MILTON.

When this strange reptile was first discovered, naturalists were puzzled beyond measure by the apparent anomalies of its structure. Some pronounced it a bird, others a reptile and others a bat. Cuvier took the skeleton in his hand and solved the difficulty. "Behold," said he, "an animal which in its osteology, from its teeth to the ends of its claws, offers all the characters of the saurians; nor can we doubt that those characters existed in its integuments and soft parts—in its scales, its circulation, its generative organs. But it was, at the same time, an animal provided with the means of flight, which when stationary, could not have made much use of its anterior extremities, even if it did not keep them always folded as birds keep their wings; which, nevertheless, might use its small anterior fingers to suspend itself from the branches of trees, but when at rest must have been ordinarily on its hind feet, like the birds, again; and also, like them must have carried its neck sub-erect, and curved backwards, so that its enormous head should not interrupt its equilibrium."

This bird-like lizard frequently became the prey of another larger reptile, now known as the Plesiosaurus which, with the great Ichthyosaurus, roamed in the waters of that strange old time, and added their own features to the wonders around them.

THE PLESIOSAURUS

Had the head of a lizard, the teeth of a crocodile, a neck like the body of a serpent, the trunk and tail of an ordinary quadruped, the ribs of a chameleon, and the paddles of a whale. Its most striking feature is the great length of the neck, which has near forty separate vertebral bones ; living reptiles seldom having more than four or six cervical vertebræ, and birds ranging from nine to twenty-three. It has therefore been aptly compared to a serpent threaded through the body of a turtle. Less remarkable in outline,

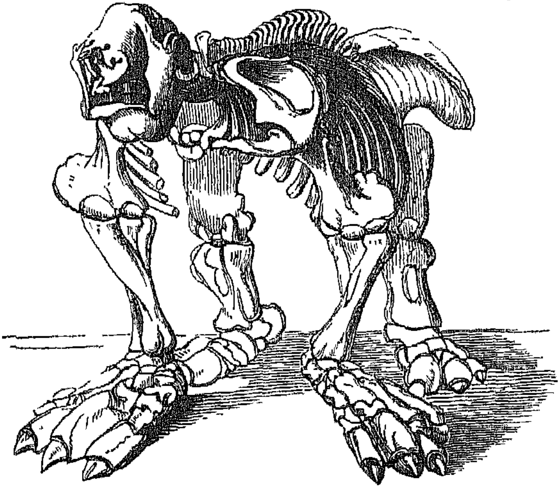
THE ICHTHYOSAURUS

Was nevertheless a great puzzle to naturalists, when, in 1814, some of its bones were found on the coast between Lyme and Charmouth, in a rock, about forty feet above the level of the sea. This strange creature, of which more than ten species are enumerated, had the snout of a porpoise, the head of a lizard, the teeth of a crocodile, the vertebræ of a fish, the breast-bone of an ornithorhyncus, and the paddles of a whale ; thus uniting in itself a combination of mechanical contrivances which are now found distributed amongst three distinct classes of the animal kingdom.

The teeth of the ichthyosaurus, in some instances, amounting to 180, and the length of the jaws to more than six feet, qualified it for predacious habits, its food being fishes and the young of its own species. A single paddle of the four which the animal possessed contained more than a hundred bones, giving it great elasticity and power, and enabling it to proceed at a rapid rate through the water. The eye was enormously large, the orbital cavity in one species being fourteen inches in its longest direction. The eye had also a peculiar construction, to make it operate both as a telescope and a microscope, so that the animal could descry its prey by night as well as by day, and at great depths in the water.

THE MEGATHERIUM

Is a huge creature of quite a different constitution to those just described, and which does not appear in any rocks so old as the reptilian series, but only in the more recent tertiary where it is the companion of large tapirs, elephants, rhinoceroses, and many other animals now existing on the face of the globe. Created many thousand years after the prevalence of reptiles, and when most of those had perished, this leviathan lived the life of a sloth in antediluvian forests, and subsisted, notwithstanding its great size and strength, on the simplest vegetable productions. It rivalled in size the largest rhinoceros, was armed with claws of enormous length and power, and in its whole frame exhibited a remarkable degree of solidity. Some specimens give the measurement of five feet across the haunches, and the thigh bone was nearly three times as thick as that of an elephant. The spinal cord must have been a foot in diameter, and the tail, at the nearest part to the body, twice as large, or six feet in circumference. The girth of the body was fourteen feet and a half, and the length eighteen feet. The teeth were admirably adapted for cutting vegetable substances, and the general structure and strength of the frame for tearing up the ground in search of roots, wrenching off the branches of trees, and uprooting their trunks, on which it principally fed. "Heavily constructed and ponderously accoutred," says Dr. Buckland, "it could



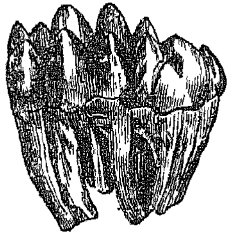
THE MEGATHERIUM.

neither run, nor leap, nor climb, nor burrow under ground, and all its movements must have been necessarily slow. But what need of speed for flight from foes, to a creature whose giant carcase was encased in an impenetrable cuirass, and who, by a single pat of his paw, or lash of his tail, could in one instant have demolished the conguar or the crocodile? Secure within the panoply of his strong armour, where was the enemy that would dare encounter this leviathan of the pampas? or in what more powerful creature can we find the cause that has effected the extirpation of his race? His entire frame was an apparatus of colossal mechanism, adapted exactly to the work it had to do. Strong and ponderous in proportion, as this work was heavy, and calculated to be the vehicle of life and enjoyment to a gigantic race of quadrupeds, which, though they have ceased to be counted among the living inhabitants of our planet, have, in their fossil bones, left behind them imperishable monuments of the consummate skill with which they were constructed." Professor Owen has since shown that the megatherium was not encased in "an impenetrable cuirass," as originally described by Dr. Buckland.

Contemporaneous with the megatherium, was another animal of huge proportions, called, on account of the peculiar structure of its teeth,

THE MASTODON.

This was a kind of elephant, having an elongated body, a thick skin and a proboscis; living in marshy places, and feeding on roots and vegetables. Its teeth were covered with a thick and brilliant enamel and set with sharp points, which caused it for a long time to be regarded as carnivorous. Parts of the skeleton, found at Albany, on the Hudson river, were described by Dr. Mather, in 1712, who deemed them bones of giants, and regarded the discovery as confirmatory of the sacred record, "there were giants in the earth in those days." *Myriads of its bones* occur along the river of the Osages, and, indeed, are commonly met with all over North America, between Charlestown and Lake Erie, from the coast of the Atlantic to the Rocky Mountains. The chief locality is Big-Bone Lake


Tooth of the Mastodon.

in Kentucky, in the marshy valleys which contain salt water.

Another of the thick-skinned animals, strictly belonging to the elephant tribe was

THE MAMMOTH,

Whose bones occur in great plenty over the north of Europe, and far up into the northern regions of Siberia. In the year 1799, a Tungusian fisherman, named Schumachoff, who generally went to hunt and fish at the Peninsula of Tamut, after the fishing season of the Send was over, had constructed for his wife some cabins on the banks of the lake Oucoul, and had embarked to seek along the coast for mammoth tusks. During this expedition he one day observed a strange shapeless mass projecting from a bank, the nature of which he did not understand, and which was at such an elevation as to be beyond his reach. The bank consisted of frozen earth, covered with ice partially thawing in the summer season. Returning to the same spot the succeeding year, 1800, he observed the object rather more disengaged, but still could not determine what it was; but towards the end of the summer of 1801, he could distinctly see that it was the frozen carcase of an enormous animal, the entire flank of which, and one of the tusks, had become exposed. The summer of 1802 was cold, and the animal remained in much the same state: but that of 1803 was warmer than usual; and, the ice melting largely, the carcase became entirely disengaged, and fell down from the crag on a sand-bank, forming part of the coast of the Arctic Ocean. In March 1804, Schumachoff came to the mammoth, carried off the tusks, which he sold to a merchant for the value of fifty roubles. In 1806, the seventh year from the discovery, Mr. Adams, travelling in that distant and desert region, on an embassy to China, with Count Golovkin, examined the animal, which still remained on the sand-bank where it had fallen, but in a greatly mutilated condition. The wandering fishermen had taken away large quantities of the flesh to feed their dogs; the wild animals, white bears, wolves, wolverines, and foxes had also feasted on the carcase; but the skeleton remained quite entire, with the exception of one of the fore-legs. The entire spine, the pelvis, one shoulder blade, and three legs were still held together by their ligaments, and by some remains of the skin; the pupils of the eyes were still distinguishable; the brain remained within the skull, but a good deal shrunk and dried; and one of the ears was in excellent preservation, still retaining a tuft of strong bristly hair. The animal was a male, and had a long mane on the neck, but was not one of the largest size. The skin was extremely thick and heavy, and as much was undestroyed as required the exertions of ten men to remove, which they accomplished with difficulty. Mr. Adams had the good fortune to re-purchase the tusks from the merchant to whom they had been sold, and finally transported the whole skeleton to Petersburg, where it now is, in the Museum of the Academy, exhibiting the following dimensions: Nine feet four inches high, sixteen feet four inches long, exclusive of the tusks, which are nine feet six inches, measuring along the curve. The hair of the mammoth appears to have consisted of strong bristles, a foot or more in length, with another kind, more flexible, and a third, a reddish brown wool, growing among the roots of the long hair. Cuvier remarks upon this fact, as an undeniable proof that the animal belonged to a race of elephants with which we are now unacquainted, by no means adapted to dwell in the torrid zone, but adapted to a temperature which would soon be fatal to the existing Asiatic and African races from its cold. We shall, subsequently, notice this consideration of climate, merely remarking, that the high latitudes now abounding with the "thick-ribbed ice" appear to have sustained an immense number of these colossal quadrupeds. There are islands in the Arctic Ocean, where the bones of the mammoth occur in prodigious abundance, which show no marks of detrition by a far transportation, and prove the exuberance of the race in the localities where their remains are found. The last of these wondrous forms that we shall mention is

THE FOSSIL ELK

Of Ireland, so renowned for its huge proportions and majestic appearance. This was a companion of the mammoth and the mastodon, and flourished in that tertiary era which we have seen to have been so fertile in wonderful living forms. The bones of this animal were found in the year 1835, and much curiosity was excited as to their history and the nature of the animal to which they belonged. It is now quite certain that in the pre-adamite ages, Europe was peopled by creatures now only to be found in climates more tropical, and besides the elephantine wonders of this region; the elk was also one of its denizens. The skeleton, which adorns the Museum of the Royal Dublin Society,* measures from the end of the nose to the tip of the tail, ten feet ten inches. The spine consists of twenty-six vertebræ; the spines of the dorsal region rising a foot in height. The chief peculiarity of the osseous system is the arrangement of the bones for the insertion of muscles, sufficiently numerous and powerful to support the head and horns, the latter weighing not less than eighty pounds. The surface of the horns is of a lightish colour, resembling that of the marl in which they were found; they are rough, and marked with several arborescent grooves, where the ramifications of the arteries, by which they had been nourished when growing, were lodged. The distance between the extreme tips of the horns is nine feet ten inches. "What," asks Archdeacon Maunsell, "could have been the use of these immense horns? It is quite evident that they would prevent the animal making any progress through a thickly-wooded country, and that the long, tapering, pointed antlers were totally unfit for lopping off the branches of trees, a use to which the elk sometimes applies his horns, and for which they seem well calculated, by having their antlers short and strong, and set along the edge of the palm, somewhat resembling the teeth of a saw in their arrangement. It would rather appear, then, that they were given the animal as weapons for its protection—a purpose for which they seem to have been admirably designed; for their lateral expansion is such, that should occasion require the animal to use them in his defence, their extreme tips would easily reach beyond the remotest parts of his body; and if we consider the powerful muscles for moving the head, whose attachments occupied the extensive surfaces of the cervical vertebræ, with the length of the lever afforded by the horns themselves, we can easily conceive how he could wield them with a force and velocity which would deal destruction to any enemy having the hardihood to venture within their range.

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* There is a fine skeleton of a fossil deer in the Geological Gallery of the British Museum, as also of the *megatherium* and *the mastodon*, which we recommend to the attention of the reader.

A SLATE QUARRY.

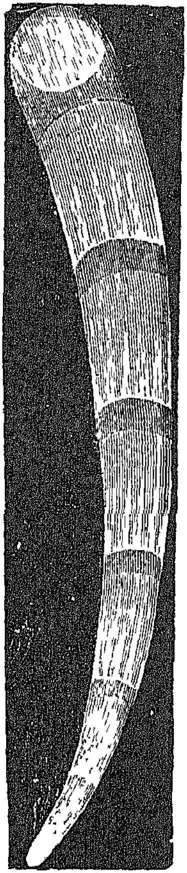
The slate quarries illustrate many important geological principles. Slate is the chief production of several large tracts of Wales and Devon, and in the Silurian rocks it forms an important constituent. The formation of slate is due to heat which acting on beds of clay in early ages of the world, caused them to assume a dense, compact, laminated form; the slates now splitting in the planes of lamination. Crystalline forces are manifested in the arrangement of beds of slate, and strange contortions are frequent in the strata with which it is associated. Owing to the great age of the formations in which slate occurs, and the bold headlands which the contorted strata frequently form, slate quarries are usually picturesque and wonderful. Huge blocks of stone, bold headlands and escarpments, deep black gorges and immense caverns are frequent in such districts; and the slate quarries of Wales are replete with such features of interest and wonder.

The most interesting of the Welsh slate quarries is that of Penrhyn, situate at Dolawen, in Carnarvonshire, six miles from Bangor, at the entrance of the lovely valley of Nant Fraugon. An immense mountain, named Y Bron, rises up out of a green valley dotted with homely sheep, and by bold slopes and sudden and steep elevations, towers up high above the surrounding scenery. The altitude of the mountain is about two thousand one hundred feet, and near its summit the slate quarry is situated. The works are most extensive and the operations wonderful for mechanical ingenuity and magnitude. Solid blocks of slate are removed measuring eighty or one hundred feet in height; and when the sun peeps into the clefts of the hills and sheds golden radiance on the embrowned visages of the workmen, the labouring horses, and the huge masses of slate, the scene resembles some of those glimpses of German mining which the romancists have so often described, and which are suitable fields for the display of the gnomes and sprites of German lore. In the sunshine the newly cut slates are extremely beautiful, and few who look upon the dark dingy masses in a slate yard would imagine that here, in its native form, the slate glitters with all the colours of the rainbow.

A slate quarry is a scene of extraordinary operations. The clink of hammers and picks, and the rumbling of the laden cars on the short railroads, varied now and then by the crash of a falling rock, or the violent explosions caused by the blasters, sound strangely to one unaccustomed to them, and derive additional effect from the huge rocks which rise on all hands, and shut in the scene as if it were a world underground. The business of separating the layers of slate from the main body is a dangerous employment, particularly when it is necessary to split the rock from its summit. This is effected by fastening a small beam to the top, with ropes at each end. Upon this beam four or five men frequently stand, and with their iron crows and sledge-hammers, flake off the slate from the sides in masses six or seven feet in length, from two to eight in breadth.

WONDERFUL COMETS.

Mysterious visitant! whose beauteous light
  Among the wandering stars so strangely gleams,
Like a proud banner in the train of night,
  The emblazoned flag of Deity it streams;
    Infinity is written in thy beams,
And thought in vain would through the pathless sky
    Explore thy secret course, thy circle seems
Too vast for time to grasp. O, can that eye
Which numbers hosts like thee, this atom earth descry?



COMET OF 1680.

No sane man, gifted with the perception of the good and fair, as seen in nature and in man, can doubt that "that eye" which "numbers hosts" of suns, and comets, and great galaxies of stars, watches also the destinies of the green world whereon man sits watching the heaven with eyes of wonder, and learning a few of its secrets with humble faculties, but sincere appreciation.

Comets have always been regarded *as among the most marvellous phenomena* of nature. Their sudden appearance in the night sky, as they rush up from the dark labyrinths of chaos into the splendour of the solar radiation, to vanish again almost as suddenly as they appeared, to wander once more in the deep infinitudes; their strange appearance and huge outline on the sky, as with "horrid hair" they wheel along as if affrighted, and seem glad to get back into their own solitary haunts. All these circumstances surround them with wonder, and with those traits of mysterious agency which the superstitious are equally ready to invent and believe. In the year 44, B.C., the Romans regarded a comet which appeared, as a messenger sent to convey the soul of Cæsar, who had been assassinated

Comet of
Ancient Writers.

just before. Respecting the comet of 1768, the period of which was seventy-six years, Lalande wrote—"We shall see dissertations spring up again in the colleges, contempt among the ignorant, terror among the people, and seventy-six years will elapse before there will be another opportunity of removing all doubt. Famines, wars, deaths, and disasters, have all been predicted as the effects certain to follow the appearance of comets; and in more than one instance, government had to adopt sagacious expediencies to allay the panic of the public at the approach of a comet. Milton refers to the comet as a presage of social disasters—

> Satan stood
> Unterrified, and like a comet burned,
> That fires the length of Ophiucus huge,
> In th' arctic sky, and from its horrid hair,
> Shakes pestilence and war.

In a general sense, a comet may be described as a heavenly body composed chiefly of vapour, having a bright nucleus to which is attached a train of light called a tail. Frequently a hazy kind of luminous vapour surrounds them, and this having frequently the appearance of hair, has given the name comet, from *κόμη, hair*, to this class of erratic bodies. The movement of a comet is in an immensely elliptical orbit, one end of which is in remote space, and the other almost in contact with the sun. It thus happens that comets experience in the course of their wanderings, the greatest extremes of heat and cold. A remarkable instance of this was seen in the comet of 1680, which approximated nearer to the sun than any body of which we have a record. With this comet came a train of fears, conjectures, and alarms, but in addition to these, it excited inquiry, and philosophy determined to benefit by the study of this object of the popular dread. The comet appeared at the close of the year 1680, and continued visible till March, 1681, when it disappeared from terrestrial eyes. Flamstead, Halley, Newton, Bernoulli, and Cassini, were all engaged in observing it, and few appearances of the kind were more imposing in appearance, or attractive in scientific interest. Its magnitude was immense. Its tail or train reached up to the zenith, when the body of the comet had set below the horizon, so as to extend over more than 180 degrees of the heavens. The length of this train was found to be 123,000,000 of miles, and in two days the nucleus emitted an additional extent of train equal to 60,000,000 of miles. Like a wrathful messenger it thus overspread the sky, and shot into the depths of far space its luminous appendage. Its rapidity of motion was almost incredible, for it spun along at the rate of 800,000 miles in an hour. This, however, was its velocity only when near the sun; far removed from his beams, its pace is that of a snail compared with a race-horse, as if the cold regions into which it finds its way, benumb its faculties, and congeal its blood; and like some of the lesser creatures of our own earth, it passes a winter of sluggish torpidity. According to Newton, this comet came within 144,000 miles of the sun's body, a proximity sufficient not only to scorch, but utterly destroy such a planet as the earth; but in the case of the comet, it seemed only to revive it, and to send it forth with renewed brilliancy and increased magnitude. If the motion of the comet had been stopped when in this position, it would have closed with the sun in three minutes—its velocity, however, prevented such a catastrophe, by constantly changing its place in reference to the sun's attraction. There is no body with which we are acquainted, but would have been dissipated at such a temperature as this mass was subjected to. Newton estimated it at two thousand times the heat of red-hot iron.

In an historical point of view, this comet has several points of interest. It is believed to have been the one which appeared just after Cæsar's death, and also in the reign of Justinian, in the year 531, and again in the year 1106, in the reign of Henry II. Comparing these dates, and taking into account the elements of the comet's orbit as ascertained by the astronomers of 1680, it seems to have a period of 574 years; at the expiration of which, it appears again in our sky. If this is correct, this strange visitant will not be seen again till the year 2255. During the great interval between one appearance and another, this comet travels some 40,000,000,000 of miles, the extreme end of its orbit being 13,000,000,000 of miles from the sun. And yet even when removed to that distance from the solar luminary, the lamp of the comet is not quenched, its life-blood still flows and energises, and it has strength left, spite of cold and darkness, and isolation from the warm, social worlds which roam together in the planetary system, to dash up again to the source of light and heat, and receive a new influx of life and power, at the very edge of that blazing furnace.

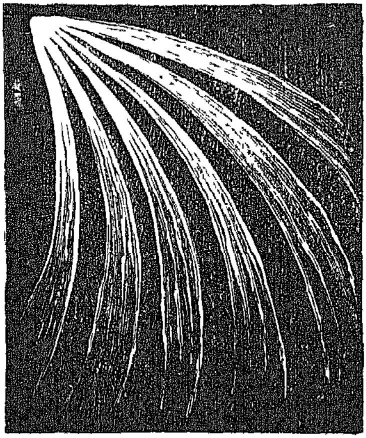
The prediction of the return of comets is one of those achievements of mathematical astronomy which we have ceased to regard with wonder. The rate of a comet's motion, and the shape of its orbit being ascertained, astronomers are able to say, when it may be again expected, and while there is no pretence of prophecy in these announcements, their fulfilment often creates surprise, and is at all times interesting. The first comet, whose return was predicted, fulfilled the prediction by appearing in 1682, a year after the disappearance of the one just noticed. Though far inferior to the former in dimensions and splendour, it has, from other reasons, become one of the most interesting bodies of the system. It presented a tail extending through thirty degrees of the hemisphere; and while science watched its movements, the eyes of the populace watched it without alarm; a sense of security following the safe departure of the preceding. With this comet Halley associated similar appearances in the years 1531 and 1607, *by a comparison of elements, says the present astronomer* royal, such as none but Halley could have performed; its period was stated at seventy-five years.

Continuing these analyses, Halley ventured to foretel its appearance in 1758; and identified it further as having appeared in the years 1155, 1230, 1305, 1380, 1456, 1531, 1607, and 1682, between each of which dates a period of seventy-five or seventy-six years intervenes. The year 1758 approached, and the French astronomers, Lalande and Clairaut, assisted by Madame Lalande, began to reconsider its elements, and asserted that it would be later in appearing than was expected, owing to the attraction of Jupiter and Saturn, which the comet would have to pass. The whole of Europe was on the alert; and, on Christmas-day, 1758, the anticipations of Halley and the French astronomers, were realised by the discovery of the comet. It passed its perihelion, the point of its orbit nearest the sun, on the 12th of March, 1759, exactly within the limits determined by the French astronomers. According to subsequent announcements the comet appeared again in 1835, and passed its perihelion in November of that year; on each occasion proving, by its peaceful passage, and quiet, though swift departure, that the lines—

> A pathless comet, and a curse,
> The menace of the universe;
> Still rolling on with innate force,
> Without a sphere, without a course:

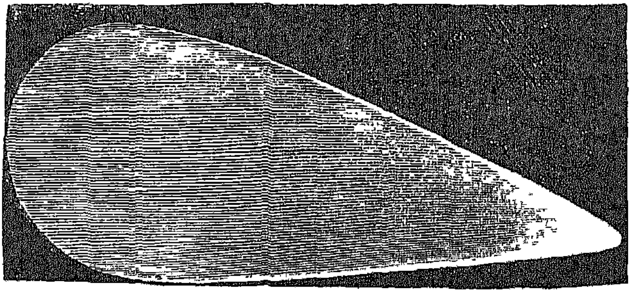
are too fictitious even for the license of poetry—these bodies being as subject to law as the other bodies of the system, and so far from "menacing," courting and engaging intellectual enquiry.

One of the most wonderful comets of modern times was that of 1743, which had six tails, all curved in the same direction, and diverging from its body. It first appeared in December, 1743, and continued visible during the spring following. On the 1st of February it was more brilliant than the star Sirius; on the 8th it rivalled Jupiter; and was visible even when the sun shone at the beginning of the next month. By selecting suitable places, many persons saw it at mid-day without glasses. Its six separate tails spread out like a fiery fan, and each measured from thirty to forty degrees in length, and four in width; the edges were bright and sharp, the middle faint, and the intervening spaces as sombre as the rest of the firmament, the stars shining through them. This comet was frequently seen in Switzerland, with the nucleus far below the horizon, and the six tails extending twenty or thirty degrees above it. On the whole it was one of the most striking exhibitions on record.



COMET OF 1743.

In 1811 the finest comet which the present generation have yet seen appeared. It was beheld in this country in the beginning of September, and was visible for more than three months to the naked eye, shinning with great splendour, the observed of all observers. It was a comet of first class, and had a tail of 123,000,000 miles in length, by 15,000,000 in breadth. Supposing the body of the comet to have been placed on the sun, its tail would have extended sufficiently far to pass Mercury, Venus, and the earth, and to approach the neighourhood of Mars. It came no nearer to us than 141,000,000 of miles, so that if its tail had been pointed towards the earth, it would not have touched it by 18,000,000 of miles. Various estimates have been formed as to the period of its revolution, and periods ranging from three thousand and fifty-six to four thousand two hundred and thirty-seven years assigned it. Even the least of these periods—constituting only *one year* of the comet's history — overwhelms us with its magnitude, and carries back the mind to the infant state of man when cities were unfounded, and fable was lisped from the lips of men then in the *first* dawn of civilization. Yet in this journey of three thousand and fifty-six years in which it descends so deeply into space, the influence of the sun follows it; not merely lighting up its vaporous body, but holding it by the power of attraction, from passing into other systems. The appearance of this comet was an ornament to the evening sky. "Many a reaper late in the harvest field stayed his hand, and many a peasant homeward bound stopped in his way, to gaze upon the celestial novelty as it grew into distinctness with the declining day." The "Ettrick Shepherd" has left some lines descriptive of the impression made on his mind by this mysterious visitor.



COMET OF 1811.

How lovely is this wilder'd scene,
  As twilight from her vaults so blue,
Steals o'er soft Yarrow's mountain green,
  To sleep embalmed in midnight dew!

All hail, ye hills, *whose towering height*,
  Like shadows, scud the yielding sky;
And thou, mysterious guest of night,
  Dread traveller of immensity!

Stranger of heaven! I bid thee hail!
  Shred from the pall of glory riven,
That flashest in celestial gale,
  Broad pennon of the King of heaven!

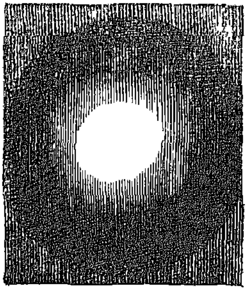
Art thou the flag of wo and death,
  From angels' ensign-staff unfurled?
Art thou the standard of his wrath,
  Waved o'er a sordid, sinful world?

No, from that pure pellucid beam,
  That erst o'er plains of Bethlehem shone,*
No latent evil we can deem,
  Bright herald of the eternal throne!

Whate'er portends thy front of fire,
  Thy streaming locks so lovely pale,—
Or peace to man, or judgments dire,
  Stranger of heaven, I bid thee hail!

The year 1811 was marked by hot weather, an abundant harvest, and a fruitful vintage. Popular opinion assigned these gifts to the influence of the *comet*; and the wine produced that year was sold at very high prices. That it was fallacious to attribute such influences to the comet there can be little doubt, for "a cold winter" and meteors in Germany are referred to the comet of 1680 by a writer in 1829.

The visitor of 1811 was terribly abused. Just as that of 1680 had attributed to it the revocation of the edict of Nantes, and the persecution of the French Protestants, and the long war that ensued; so this later visitant was widely regarded as the herald of some terrible convulsions, not a few seeing its effects amid the marching of Napoleon's armies from the West, to perish in the Russian snows, and the awful conflagration which consumed the city of Moscow.



ENCKE'S COMET.

Encke's comet was first observed by Messier in 1786, afterwards seen by Miss Herschel in 1795, and again by M. Pons in 1805, affords a good instance of the periodical movements which comets perform in common with other celestial bodies, and sufficiently demonstrates the absurdity of the line—"Without a sphere without a course." This comet appeared in 1819, and was shown by Encke to be identical with the previous appearances just mentioned; and having established the identity the comet received his name.

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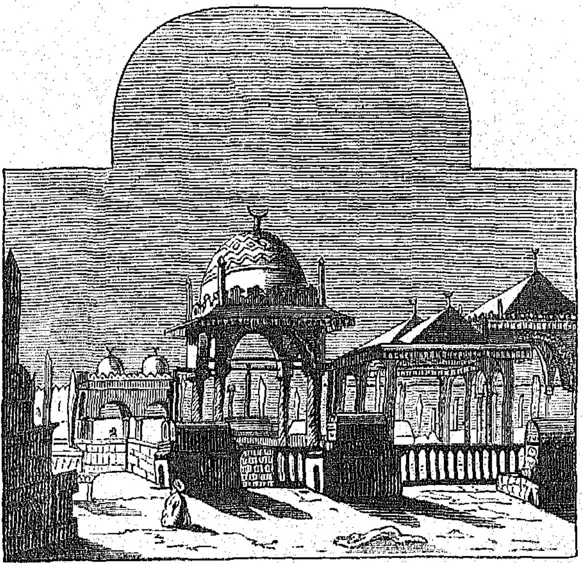
* It was reckoned by many that this was the same comet which appeared at the birth of our Saviour.

When nearest the sun it is within the orbit of Mercury, and when farthest between the planetoids and Jupiter, so that it is an integral part of the planetary system, and performs all its motions in close vicinage to the planets. Its revolution is performed in twelve hundred and three days, or three and three-tenths years. None of the comets have been more true to their appointments than this, which has established itself as a regular constituent of our system. It has however obtained an interest of its own from certain conditions of space which its motions indicate; and in this respect it is perhaps the most instructive comet yet seen.

It has been found that by watching Encke's comet and noting the several passages it has made, that it approaches at every fresh revolution, nearer and nearer to the sun. A mode of explaining this progressive approach to the solar body, is to suppose the existence of a *medium* in space able to resist its motions, and allows the sun to gain upon it gradually by the force of attraction. This explanation has been regarded by scientific men as so satisfactory that it is universally adopted; and it is now a part of the astronomical faith, that space is filled with a thin ether which resists the motions of the various bodies, and to a slight extent retards their progress. The conjectures which follow upon this admission are many and important. Will the planets be arrested by this pervading ether, and driven nearer and nearer to the sun until at last they verge into the solar body, as the comets themselves appear to be doing? or is there some compensating power, which will come into operation at a certain point in their passage to the sun, and drive the planets back to their ancient orbits? These are questions which we cannot answer; meanwhile comets appear and disappear, and of the many which have been lost, who knows but some may have long since collapsed with the great luminary, perhaps to furnish him with the fresh material for the dispensation of that warmth on which we depend for our spring and summer seasons, and for our golden harvests? No matter what terrible ends may be the fate of comets; the *whole* scheme is perfect, and the destruction of one body is only essential to the birth of another, and so on without end, every phase of the progression being full of beauty, contrivance, and perfection.

In ardent contemplation's rapid car
From earth, as from my barrier, I set out.
How swift I mount! diminished earth recedes:
I pass the moon, and from her further side
Pierce heaven's blue curtain, strike into remote.
From Saturn's ring, with the bold comet
Take my bolder flight, amid those sovereign
Glories of the skies. What behold I now?
A wilderness of wonders burning round
Where larger suns inhabit higher spheres,
Nor halt I here, my toil is but begun;
'Tis but the threshold of the Deity. YOUNG.

SEPULCHRES, CEMETERIES AND CATACOMBS.



CEMETERY AT CONSTANTINOPLE.

AMONG the remarkable monumental piles of Egypt, few possess more absorbing interest than their cemeteries, where repose in everlasting silence the remains of thousands of the rich, the great, and the distinguished of ancient time. The illustration represents one of the best specimens of those national resting places for the dead. They are conspicuous for their peculiar beauty and grandeur, being decorated with the utmost profusion with brilliant colours, gorgeous gilding and sculptured marble in every variety of ornamental relief Independently of the lavish ornament which appears in the sepulchres of the sanctified and the opulent, the graves are in almost all cases constructed on very similar principles. They are usually covered with large round stones, appearing very like coffins, with convex lids, having in some instances receding stages, and on the top a space corresponding with the dimensions of the body below. At both ends the stones are placed perpendicularly, and usually tapers toward the ground. That at the head is surmounted by a sculptured turban, such as the deceased usually wore, and by which the position in life which he occupied, can be easily distinguished even by those who are unable to read. In that country almost every grade of society have a distinguishing head-dress. The inner surfaces of the stones, which are always flat, are covered with inscriptions in high relief, the letters of which are well executed, and frequently painted over or gilded. For Seyds, and other persons of reputed sanctity, the letters are commonly painted black on a green ground, green being the holy colours of Mahomet. And on the grave-stone of those who died in early youth, their innocence is supposed to be indicated by the letters being gilt on a white ground. The burdens of the inscribed surface, the edges of the stones, and their outer surface are generally painted with very vivid colours, and resplendent with gilding. It is curious that the sculptured parts of these stones are much superior to the painted. The painting usually represents flowers, pine-apples, clusters of grapes, or the principal implements of the particular business which the deceased followed. Among the Turks, the honourable circumstance of decapitation by the Sultan's order, is commemorated by an attempt to represent the deceased in painting or low relief, with his head under his right arm. Christians in indicating the same fact, are obliged to place the head between the legs. The moslems carefully keep up, even after death, the paltry external distinctions between themselves and others, which they so carefully assert during life. None but Turks are allowed to have the cypress in their cemeteries. Christians may plant any other trees, but the Jews are allowed none whatever. Again, Christians are not allowed to have any perpendicular grave-stones, but they may and do raise decent oblong masses of masonry to support the inscribed horizontal slab, which the Jews are obliged to lay on the ground.

In periods the most remote, cemeteries are found to have been set apart by the laws, and sanctioned by religion. The Jews had their funeral field. Their first care on arriving in a new country, was to select a spot for their sepulchres. Such city had its public cemetery *without the walls.* In England, we have been a long time in learning the wisdom of this arrangement. The cemetery of Jerusalem was in the valley of Cedron: and not far from that of the Pharisees was a distinct one for strangers. The infection of this example has also reached us, for in some of our public burial-places, we have what is called consecrated and unconsecrated ground. The Greeks, before they adopted the Phrygian custom of burning the dead, interred them in the fields, and even afterwards continued to make use of cemeteries, where they deposited the urns which enclosed the ashes of the dead. It is a remarkable fact, and also a strange anomaly, as it affects ourselves, that the wholesome custom of burying the dead away from the living, is observed among all the people of the earth, except those of Christendom.

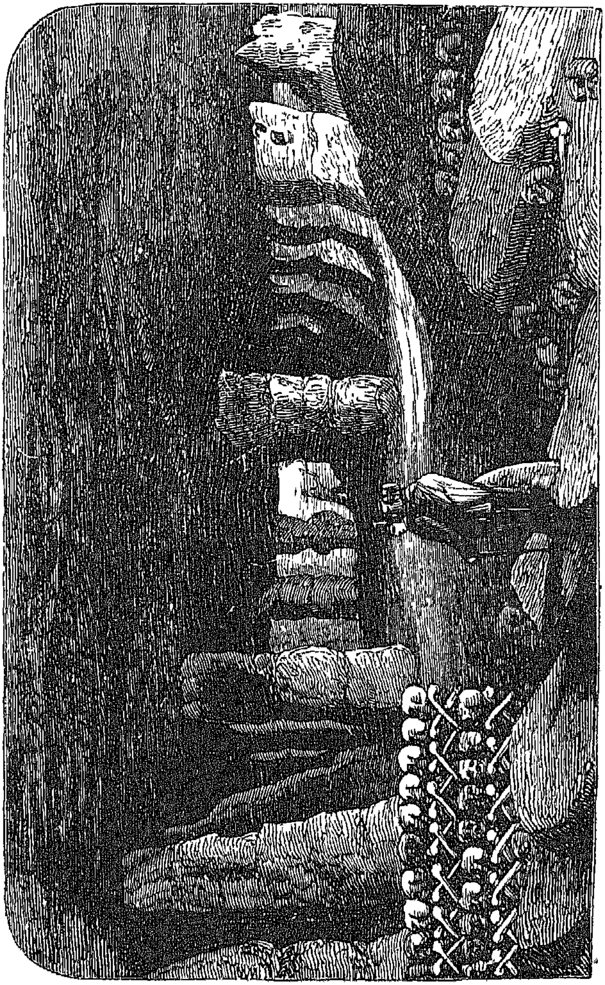
The various practices of different people in disposing of their dead, is an interesting inquiry. " In some parts, the dead are thrown over precipices, or abandoned in the deserts, woods, or ditches, to the hunger of wild beasts and vultures; and, in others, they are consigned to the rivers or the seas, and become the prey of fishes. In the East Indies they are dried by fire, and then enveloped in cloths, and deposited in the earth. In other parts of the same country the fire is suffered to consume the corpse altogether. The Parsees have two cemeteries, one white, and the other black; in the one, they bury those who have lived in the constant practice of virtue, and consign to the other those whose life has not been without reproach.

The various native tribes of America are represented as having recourse to several curious observances. " The Arragues, who inhabit the south of the Orinoco, suspend the corpse in its cabin until time has consumed the flesh; they then reduce the bones to a powder, which they mingle with their drink; or they burn the body and make the same use of the ashes. The Abipones of South America, generally inter the dead under the shade of a tree; and when a chief or warrior dies, they kill his horse on the grave. After a time the remains are exhumed, and conveyed to a place more secret and distant than the first. Some tribes make skeletons of all the dead, and place them in a sitting posture clothed with robes and feathers, in the cemetery, which is opened every year, when the skeletons are cleansed and clothed anew. Most of the tribes of the American Continent manifest the desire that their bones, and those of their fathers should rest in the land of their nativity. When the Nomade tribes of South America wander many hundred miles from their proper boundaries, and one of their number happens to die, they reduce the body to a skeleton, which they place on the favourite horse of the deceased, and carry it with them till they arrive at the place of his family, however distant. In many tribes, when the encroachment of the white man drives them from their ancient domains, they exhume and take with them the bones of their ancestors and friends.

In early times, the Assyrians and Babylonians covered the dead with wax previous to interment. The Egyptians held the consoling doctrine of the immortality of the soul, and connected its existence with the duration of the body, which they therefore embalmed, and preserved with great care in the houses, or in the catacombs devoted to this purpose.

The Catacombs of Paris are among the most wonderful things in the world. They are large subterraneous quarries, extending under a large part of the city. When Paris was first built the stone was raised or excavated from the environs, and in subsequent years, when the city was enlarged, the suburbs were built over the quarries, from which the stone had previously been obtained for the building of the city, so that all the Faubourg St. Jacques, the Rue de la Harpe, and the Rue Tournon, standing immediately over the ancient quarries, are without proper foundation, and in many places pillars have been erected to support the weight of the houses. At the principal entrance to the catacombs, the Barriere St. Jaques, there is a descent by steps to the depth of 360 feet perpendicular.

" At the entrance the path is narrow for a considerable way, but the visitor afterwards enters large and spacious streets, all marked with names as in the city above and advertisements and bills are not unfrequently seen pasted on the walls, so that the place has in some measure the appearance of a large town swallowed up in the earth. The general height of the roof is about nine or ten feet; but in some parts not less than thirty and even forty. In certain places it is secured by immense stones set in rock, in others it is totally unsupported for considerable distances, the roof



THE CATACOMBS OF PARIS.

being level as a plain piece of rock. After the visitor had walked about two miles, it used to be the custom to show him into a kind of saloon, cut out in the rock, and said to be exactly under the church of St. Jacques, which was occasionally illuminated, and contained representations in miniature of fortifications, with cannons ready to fire, &c. The journey through these catacombs is a very tedious one, the damp and cold air often producing unwholesome effects. The temperature, for the most part, is colder than on the surface of the earth, except in hard frosts. These caverns were formerly infested by a gang of robbers, who would sally forth during the night and commit their depredations; but they were eventually prevented, by all its entrances being closed except two, and these of late years have been closed also, in consequence of the alleged danger of traversing the vaults.

The catacombs contain all the visible remains of human creatures that had filled the burial places within the walls of Paris for nearly a thousand years. They were brought from the cemeteries, particularly that of Les Innocens, in 1788, when the bones were placed in regular rows, with appropriate inscriptions serving as lessons to the living. There are above two millions of skulls, which are placed in conjunction with the bones of the legs and arms, in a manner which had a very striking appearance. Many of these belonged to the victims of the revolution of 1792.

The different parts of the catacombs are named with strange incongruity, after the purport of the inscription which was placed there, or from the name of the authors of the inscriptions.

Virgil, Ovid, and Anacreon, have each their crypts, as well as the prophets Jeremiah and Ezekiel, and Hervey, the author of the "Meditations," takes his place with Horace, Malherbes, and Jean Jacques Rousseau. Among the ornaments is a fountain in which four golden fish were imprisoned. Among the many inscriptions taken either from scripture or from the poets, there is a remarkable one over a spring which was originally discovered by some workmen. M. de Thury first named it the "Spring of Oblivion," and Virgil was drawn upon for an inscription. But subsequently this was changed for the text of Scripture, "Whosoever drinketh of this water shall thirst again; but whosoever drinketh of the water that I shall give him shall never thirst; but the water that I shall give him shall be in him as a well of water springing up into everlasting life."

The sepulchres of Etruria may also be mentioned as among the most wonderful instances of the kind, which the researches of Antiquarian curiosity have brought down to us. The Etruscans were a people of a mixed race, who flourished long before the age of Roman dominion, having established their homes in Italy about 290 years before Rome was founded, or 1044 years before the birth of Christ. "But proud Rome never fully acknowledged the debt of gratitude she owed to Etruria and the influence of Etruscan civilization on her own development, and through her on every other nation, on whom she once exercised dominion.

"That part of ancient Etruria which has furnished the greatest number of relics to the antiquary extends over the whole of Tuscany, and that portion of the papal dominions which lies to the north of the Tiber. In these regions the cities were most thickly studded; and though few remains of their proud walls, their well-paved roads, their admirable system of drainage aud tunnelling, have survived the ravages of time to bear testimony to their ancient glory, the sepulchres, with which almost every range of cliffs throughout the land is lined, and the tombs, hundreds of thousands of which are hidden beneath the surface of the soil, are still extant, and bear record that here a populous nation lived and died; while the architecture, furniture, and decorations of these tombs, tell us more of the manners of the people, of their national customs, of their modes of life, their religious observances, their artistic development and intellectual ideas, than all the fragmentary records of their national existence met with in the Greek and Roman writers of antiquity.

"Of Etruscan literature not a vestige is extant; yet we know from ancient writers that Etruria possessed a national literature, comprising history, poetry, and dramatic compositions, besides the sacred books of Tages, in which the mysteries and rites of the established religion were recorded, and commentaries on these, one of which was written by a woman and that this literature must have attained no mean development, is proved by the fact, that the Romans used to send their sons to the Etruscan cities to gather knowledge from the intellectual sources of a nation which likewise excelled in the practical sciences of agriculture, navigation, and military tactics. Though many of the scenes depicted on the walls of the sepulchres of Etruria, and on the innumerable painted vases found in them, as well as the records we have of their histrionic art and their love of music, attest that the Etruscans were not indifferent to the more spiritual enjoyments of life, yet it is supposed that their tastes were more utilitarian than artistic, and that they were far inferior to the Greeks in the love of the beautiful, though they excelled them in those branches of civilisation which conduce to the 'creature comforts' of life."

But it is to the cemeteries and sepulchres alone of Etruria that we wish to call special attention. These are always *found contiguous to* the site of towns, being excavated in the side of the cliffs of tufa, or other friable volcanic rock. The towns are sometimes surrounded on all sides by tombs. Under the Emperor Theodoric there was a *general rifling*, as far as they were then known, of these resting places of the dead, but only the ornaments in gold and silver were abstracted. The sepulchral caves have since then been used as wine cellars, and the styes of pigs and other animals, and the sarcophagi, or tombs, have been transmuted into mangers and watering-troughs. But so rich in treasure are those ancient repositories of the dead, that their excavation is carried on as *a good speculation*, and that of Vulci has furnished the Prince of Canino with the means of forming a most splendid collection of Etruscan antiquities, and also enriched many of the museums of Europe.

The tombs of Morchia and Castel d'Asso were brought to light only forty years ago; those of Bomarzo in 1830; of Orte in 1837; and of Savona as recently as 1843. In consequence of the interest which now prevails among antiquarians with reference to these sepulchral treasures, their search is pursued with great energy, and with such success that it seems as if the whole of Tuscany and a great part of the papal states were literally undermined by these cities of the dead. Though of such ancient date, it is said that the tombs so closely resemble those of the Romans and the early Christians, that were it *not for* the Etruscan inscriptions which they bear, they might easily be mistaken for the catacombs of that period. On many of the tombs there are inscriptions still legible, being graven deep in the smooth surface of the rock above the doorways.

Among the Etruscans, the fashion of burning as well as burying the dead prevailed. Interment, in some instances, at least, seems to have been adopted as a mark of distinction, as large urns, supposed to have contained the ashes of slaves and retainers of families, have been found in the same sepulchral chambers. Many of these sepulchres are hewn out of solid rock; the whole internal arrangement of others recall to *mind the habitations of the living*, and those of Bieda, and Banditaccia near Cenetri, have evidently been laid out in streets and squares, the facades of the tombs occupying the place of those of the houses in the cities of the living. The internal arrangements of the tombs indicate pretty clearly the nature of the dwelling-houses of the Etruscans; the ceilings of the chambers having the usual beams and rafters hewn in the rock. In one tomb there are two arm-chairs, each with a footstool attached, hewn out in the rock, in the atriumbetween the doors leading to the inner chambers; and above each chair is a round shield suspended on the wall. Again, some of the walls are completely covered with paintings, the colours of which, though now faded, must have been most gorgeous in their original state. Some of the subjects are exceedingly peculiar, the workmanship indicating considerable perfection of execution. Not only is the social condition in its more loveable and purifying aspects exhibited on the walls of the tombs, but even the sportive employments and bacchanalian indulgences of the Etruscans are also fully represented. As a general rule in these representations, the males are distinguished from the females by the colour of their flesh, the males being painted a deep red, and the females left the colour of the ground on which the figures are painted. In several tombs vases containing eggs have repeatedly been found, and it is supposed that some idea connected with the dead has been attached to this species of food. In others ornaments of the purest gold and exceedingly valuable, such as bracelets, necklaces, brooches, chains, and ear-rings, while many others are supposed to have been wholly pilfered of their treasures ages ago. On the authority of the "Annals of the Institute of Rome," it is affirmed, that such a collection of jewels as have been found in one of these tombs, could not be met with in any jeweller's shop of the present day. The subjects drawn on the vases are beautifully conceived and exquisitely wrought, indicating a high state of civilization and considerable artistic skill, though probably done long before the Christian era. Bearing in mind the immense antiquity of those sepulchres, their high stato of preservation is truly marvellous, though of course those which have been exposed to the chemical action of the atmosphere, may not only be said to be defaced by the gnawing tooth of time, but are in the last stages of decay, and must soon entirely disappear.

Of all the peculiarly-constructed sepulchres of Etruria, few have, however, excited so much interest as the polyandrian tombs in a hill called Poggia Gajella at Chiusi. The labyrinthine passages which in this instance were found to lead from one grave-chamber into another, for a time nourished the hope that this might prove to be the tomb of Porsenna, (the king of Etruria, before whom proud Rome once trembled, and to whose magnanimity alone she owed her salvation), and which was said to have been erected on a site in this neighbourhood, but which is described by Varro in terms so extravagant, as to have been considered fabulous by all sober-minded people. Persenna was buried, says Varro's description as reported by Pliny, "under the city of Clusium (Chiusi), in a spot where he has left a monument in rectangular masonry, each side whereof is 300 feet wide and 50 feet high; and within the square of the basement is an inextricable labyrinth, out of which no one who ventures in without a clue of thread can ever find an exit. On that square basement stand five pyramids, four at the angles, and one in the centre, each being 75 feet wide at its base, and 150 high; and all so terminating above, as to support a brazen circle and a *pedasus*, from which are hung, by chains, certain bells, which, when stirred by the wind, resound afar off, as was formerly the case at Dodona. Upon this circle, four other pyramids are based, each rising to the height of 100 feet. And above these from one floor five more pyramids, the height whereof Varro was ashamed to mention."

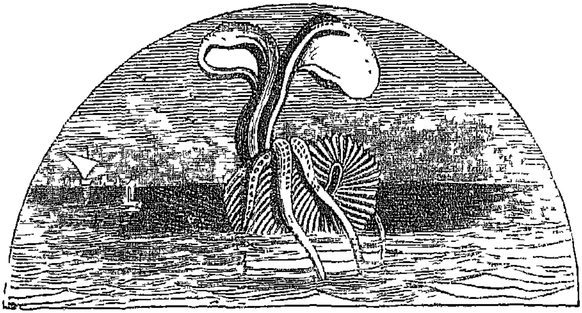
It is curious to note how casually some of these tombs have been discovered. In one instance, to which we have already referred, a field in the vicinity of the village of Canino being ploughed by a yoke of oxen, the ground suddenly gave way beneath them, and disclosed an Etruscan sepulchre which has proved a mine of wealth. Two others were brought to light by rambling sportsmen, who, while in quest of game found graves. Thus these ancient repositories of the dead, which for ages have been unknown to mankind, are now revealing their treasures of wealth and of wisdom to living men, who in in their turn, to generations in ages to come, may supply the same kind of evidence of previously existing races, when every *other monument of their existence shall* for ever have passed away.

THE NAUTILUS.

When southern suns and winds prevail,
  And undulate the summer seas;
The Nautilus expands his sail,
  And scuds before the freshening breeze.

Oft is a little squadron seen
  Of mimic ships all rigg'd complete;
Fancy might think the fairy queen
  Was sailing with her infant fleet.
SMITH.

FAMED in fable and in song, the Nautilus is as beautiful an object, both in appearance and economy, as anything sacred to classical literature. There are two kinds, one known as the Paper Nautilus, the other as the Chambered Nautilus. The Paper Nautilus is that which has chiefly engrossed the attention of the fanciful, and which has been made the subject of so many strange fictions. The shell is one of the most elegant of the whole tribe of univalves, and is remarkable for its thinness, its pure whiteness, and the elegant ribs that run towards the keel. It has been said that the Nautilus is the first and best of sailors, and that from him men have learnt the art of navigation. His name, Argonaut, signifies a mariner, as Argo signifies a ship. In the Mediterranean and the Indian Ocean the Nautilus is common, and their seas are the scenes of his reputed exploits. He is said to rise to the surface in calm weather, and to float along in the most elegant manner, by spreading certain little membranous sails before the wind, and, at the same time, rowing himself by means of his feet, as represented in the cut. Sometimes he only spreads his sails, and suffers his eight arms or legs to hang over the sides of his boat, or, occasionally, to employ them to steer by—a perfect gondolier, minus the singing. In Wood's "Zoography" we read, that "in order to rise from the bottom of the water, for the purpose of sailing on the surface, the Nautilus discharges a quantity of water from its shell, by which it becomes lighter than the surrounding medium, and of course rises to the top. Numbers of these curious animals may be seen sailing about, and diverting themselves on the smooth surface of the sea; but if any danger approaches, or the winds begin to rise, they immediately lower their sails, and shrinking into the body of the shell, sink at once to the bottom. Their extreme timidity makes it very difficult to take them alive; for, whenever any person approaches, they immediately leave the surface of the water, and although seamen have often got very near them,



THE NAUTILUS.

yet, when they arrived within a certain distance, and stretched their hands to secure the fish, they constantly disappointed the person by sinking to the bottom."

A fiction so faithful could not long escape the poets, who have in many instances turned it to beautiful uses. Montgomery describes its rising from the bed of the ocean in a manner at once delicate and graphic—

Light as a flake of foam upon the wind,
Keel upward from the deep emerged a shell,
Shaped like the moon ere half her horn is filled;
Fraught with young life it righted as it rose,
And moved at will along the yielding water.
The native pilot of this little bark
Put out a tier of oars on either side,
Spread to the wafting breeze a two-fold sail,
And mounted up, and glided down the billow
In happy freedom, pleased to feel the air,
And wander in the luxury of light.
Worth all the dead creation, in that hour,
To me appeared this lovely Nautilus,
My fellow being, like myself, *alive*.

Dr. Barnard draws from it a lesson of hope for the welfare of the absent—

Up with the thin transparent sail,
Thou tiny mariner!—The gale
Comes gently from the land, and brings
The odour of all lovely things,
That Zephyr in his wanton play
Scatters in Spring's triumphant way

* * * *

Up beauteous Nautilus!—away!
The idle muse that chides thy stay
Shall watch thee long, with anxious eye,
O'er thy bright course delighted fly;
And when black storms deform the main,
Cry welcome to the sands again!
Heaven grant that she through life's wild sea
May sail as innocent as thee;
And, homeward turned, like thee may find
Sure refuge from the wave and wind.

It seems a poor compensation for the loss of this delicate and fanciful idea, for science to inform us that, by accurate observation of the living animal, it is found that no such navigation is exhibited by it; but that the expanded arms are spread over the shell, meeting along its keel or edge, and almost completely enclosing it. These flat fingers are not sails then, but secreting organs by which the calcareous secretion is poured out for the increase of the shell. By the action of the arms it does swim, but backwards, and instead of its being a poetical embodiment of the fairy style of navigation, invented by Nature in a moment of ideal exhilaration, for the especial delectation of rhapsodists and parlour poets, it is a fishy worm-like creature, living on the slime and filth of the ocean, perfectly ignorant of all the Argonautic expeditions to which it is said to have given rise, and perfectly contented with salt water, a muddy bed, and a slimy surface to feed in.

ECHOES.

An Echo is nothing more than a return of the waves of air: and waves of air are caused by the sudden explosion of pent-up gases, causing the particles of air to rub violently one against the other. An echo is a reciprocated sound, a sound driven back because the waves of air have come in contact with some substance, which either is not a conductor of sound, or which does not conduct with facility. Wood, stone, earth, air, and water, are all conductors of sound, but there is this peculiarity, that sound does not pass with facility from one substance to another. Thus a sound caused in air will not readily pass into stone, earth, or wood, although wood itself conducts sound with immense velocity. Just as the waves of water in a basin are made to oscilate by coming in contact with the sides of the basin, so sound is reproduced or driven back to the centre from which it proceeded by coming in contact with harder or different bodies from that in which it was first produced. Echoes are frequently heard opposite old walls; near masses of rock; and in the neighbourhood of forests, and even of clouds; but they are only heard when sound is intercepted, and made to rebound by one or more obstacles. When there is but one obstacle the echo will be single, because the sound, being impelled backwards, will continue its course in the same direction without returning. But if there be several obstacles, as for example, several walls of different heights, placed in a line behind each other, a repetition of the original sound will be heard, causing a succession of echoes, each fainter than the preceding. Echoes are also caused by the return of the waves of air from surrounding obstacles, and it is in such cases that repeated echoes most frequently occur. The most powerful echoes are occasioned by obstacles arranged in the form of an ellipse; and in some instances the echo is even louder than the original sound.

Among the most wonderful echoes may be mentioned the following—At Woodstock park, in Oxfordshire, there is an echo which returns very distinctly seventeen syllables in the day, and twenty at night. At Roseneath, near Glasgow, an echo repeats a tune played on a trumpet three times, completely and distinctly. An echo at Brussels, answers fifteen times. One at Simonetta Palace, near Milan, in Italy, returns the sound of a pistol fifty-six times.

Echo, by the ancients, was supposed to be the daughter of Air and Earth, who having fallen in love with the youth Narcissus, at his death pined away with grief, but being immortal preserved her voice, repeating every sound which reached her.

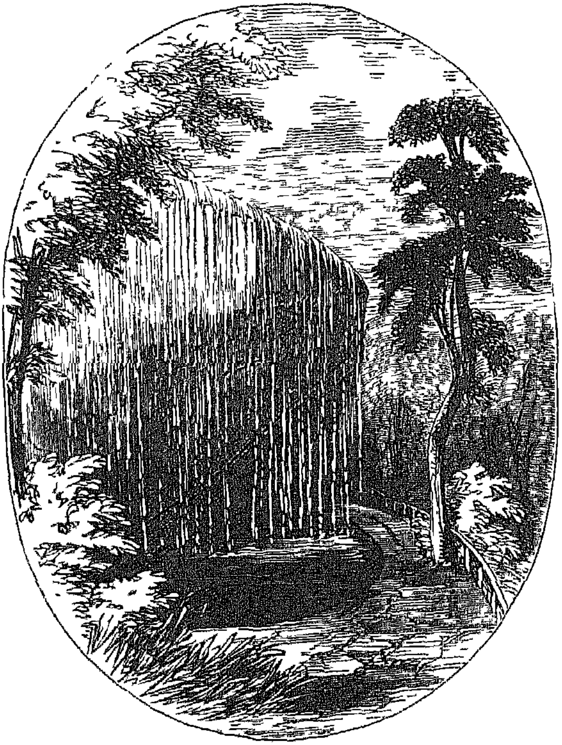
But one of the most singular echoes with which natural philosophers have supplied us with any account, occurs on the banks of the Rhine, near Lurley. It is thus mentioned in the British Cyclopædia—"Between St. Goar and the ruins of Schonberg, at a spot where the Rhine, from the direction of its deep sinuosities, assumes the appearance of successive and isolated island lakes, bounded all around by upright gigantic rocks, or sloping hills, clad with vines to their very summits; the postillions suddenly checked their career, and turning the wide end of their bugles to the reach of the river we had just passed, blew loud and strong their post-boy tune, and then held their breath. Quickly the musical sounds were heard repeated in a clear and distinct manner, not far from us; and again, a second and a third, and even a fourth time, but as if from a progressively increasing distance, until they died away. The experiment, more than once repeated, proved equally successful. We were assured that the repetitions of the sound are more numerous when the experiment is made in a boat, placed midway between the two banks.

"It is not to be expected, that so remarkable a phenomena should go without being converted into an allegorical tale, during the ages of ignorance and superstition. How, in fact, was this never-failing repetition of the fishermen's choired morning prayer and evening song, which some invisible voice responded in the distant space, as he glided over the bosom of the water, to or from his daily toil, to be accounted for? Imagination, ever ready to plunge into the supernatural, created a lovely nymph, and placed her abode on the rock ot Lurley, from the sides of which the sounds are principally reverberated. A dangerous eddy lies on the broad shadow of this rock, and many a time, when the amazed boatman tracked his way through the stream, listening to the mysterious voice from the height of Lurley, his frail bark, drawn within the vortex, would miserably perish under the rocky dwelling of the syren. Attracted by the reports of her beauty, and spurred on by the proclaimed cruelty of her disposition, the youthful son of the Count Palatine of a neighbouring country, determined on seeing the virgin of Lurley, and carrying her a captive to his father's court. His fate was sad; for on arriving, escorted by a few followers, in the agitated waters of the Lurley, his boat was whirled round and disappeared. Grieved at the loss of his child, the Palatine Count despatched a trusty band to seize the relentless nymph; and just as their rude leader, unmoved by her heavenly charms and dishevelled tresses, was in the act of summoning her to surrender, a sudden hurricane swelled the stream, the waves, crested with foam, rose to the top of the rock, and encircling the lovely Undine, saved her from the rude grasp of man, and carried her to the realms of her father. Her voice is still heard returning the song of merriment or sorrow, but her beauteous form appears not on the heights of Lurley."

WONDERFUL SPRINGS.

SECOND PAPER.

The origin of Springs is variously stated. Some say that they arise from the rain and melted snow which the earth absorbs. Others affirm that they are caused by the subterraneous decomposition of oxygen and hydrogen gas, and that, therefore, in some parts of the earth, there are chemical laboratories, where nature, by some mysterious process, is continually manufacturing the aqueous element. Others state that the earth is a huge filter, and that the waters of the sea is being continually conveyed into cavities and reservoirs, prepared by



THE DRIPPING WELL AT KNARESBOROUGH.

the Great Architect of the Universe, and from whence it again issues, when deprived of its injurious properties, Some writers have contended that the rain and snow which falls on the surface of the earth is the sole cause of Springs, but perhaps this ought to be regarded as an overcharged affection for a particular theory. Our object, however, in these papers, is chiefly to call attention to the phenomena of springs, and not to their philosophy or causes, which the best informed confess are obscure, and in some instances entirely unknown.

In a previous number, we called attention to the Geysers, or boiling springs of Iceland, which, in kind, are neither surpassed nor equalled in the whole world. But there are other springs, marked by a different kind of phenomena, quite as wonderful. There are springs which have the appearance of boiling, although no increase of temperature is observable. This is occasioned by the passage of currents of air or gases in connection with the water. At Peroul, near Montpellier, there is one of this kind, which bubbles and heaves up furiously, The river Etang, in the same locality, in some parts exhibits the same appearance. In several dry places of the ground in that district, it was found, by Dr Robinson, that there were many small passages or clefts, which sent up air with sufficient force to blow aside many light bodies, such as feathers, straws, and leaves. Humbolt mentions a place in South America, near the Indian village of Turbaco, where there is a spring which the natives call Los Volcanitos. "They affirmed that according to a tradition preserved in the village the ground had formerly been ignited, but that a monk had extinguished it by frequent applications of holy water, and converted the fire volcano into a water volcano. The Volcanitos consisted of several small truncated cones having a height of about twenty feet and their circumference, at the base, nearly eighty yards. At the top of each cone there was an aperture about two feet in diameter, filled with water, through which air-bubbles obtained a passage, Each of the bubbles contained upwards of a foot of elastic fluid, and their powers of expansion was often so great that the water was projected over the brim of the cone. Some openings, by which air escaped, were observable in the plain, without being surrounded by any prominence of the ground. The natives asserted that there had been no observable change in the form and number of the cones for twenty years, and that the little cavities are filled with water, even in the dryest seasons. . . . . An ignited body was immediately extinguished on being immersed in the gas collected from the bubbles, which was found to be pure azote."

INFLAMMABLE SPRINGS.

These, though not very numerous, are found in several parts of the globe. "The substance usually found oozing out of the ground, in connection with these waters, pass under the names of pitch, naphtha, petroleum or rock oil, and bitumen. Naphtha is the purest state of this substance, which becomes petroleum, upon a certain exposure to the air, and bitumen upon a continued exposure to it."

The poet and Roman philosopher, Lucretius, has attested the fact, that the fountain of the temple of Jupiter, at Dodona, was inflammable.

> "A fount there is too, which, though cold itself,
> With instant flare the casual flax inflames
> Thrown o'er its surface; and the buoyant torch
> Kindles alike immediate o'er its pool,
> Steering the course th' etherial breeze propels."

Many others have testified to the same fact, among whom we may mention Pliny and Herodotus. The latter observes, "In Zacynthus I saw pitch brought up out of the water of a pond. Indeed there are several of these ponds; but the largest of them is about seventy feet square and twelve feet deep." But these naphtha springs exist, in greatest abundance, west of the Caspian, in the territory of Balkan, where the scene is alike marvellous and imposing. Wherever a hole is bored the naphtha instantly streams up. Colonel Rittier states—"It appears to undergo distillation as it ascends to the surface, and thence falls down to the sides of the mountains into reservoirs, constructed at some unknown period." The colour of this liquid is black, except when the sun's rays fall upon it, when it appears to have a reddish tint. In the same district there are springs of white oil, which readily inflames upon water. In calm weather vast quantities of it are poured out by the people into the bay of Caspian, for the purpose of amusement. They then ignite it, when, from a distance, it appears like a sea on fire, and so magnificent is the effect, that the most splendid illuminations or fire-works are insignificant in the comparison. In one locality, in the Birman empire, there is said to be upwards of five hundred petroleum springs, yielding annually 400,000 hogsheads. In the island of Trinidad there is a vast lake of bituminous matter, and around the island it oozes from the bottom of the sea, and rises to the top of the water.

The origin of these inflammable springs is said to be immense forests of wood, which, long ages ago, have been buried by some desperate volcanic effort of nature. To what remote ages they may reach it is impossible to say, as some of the springs have been known to exist before the commencement of the Christian era.

There are many other springs which, though not very remarkable in any other particulars, are exceedingly so in the score of their antiquity. The fountain of Arethusa, may be mentioned as a notable instance. Here the author of the Odyssey was a pilgrim, more than three thousand years ago, and drank of the limpid spring, at which now the goat-herds of Ithaca quench their thirst. The fountain of Castalia, in which the Delphian Pythoness laved her limbs, is another instance consecrated alike by age and the worship of the Muses. This spring was visited by Byron, in 1806, who left in verse a memorial of his admiration. Its water is remarkable for its excessive coldness, and is mentioned by Dr. Chandler as so chilling that, on washing his hands in it, he was immediately seized with tremor, and rendered unable to stand or walk without support. "This incident, when Apollo was dreaded, might have been embellished with a superstitious interpretation. Perhaps the Pythian, who bathed in this icy fluid, mistook her shivering for the god."

There are also lime springs, and bitter springs, referred to both in sacred and profane history. The wells of Arabia were the halting places of the descendants of Jacob, who when they came to Marah, which there is every reason to believe is what is now called the fountain Hawirah, "they could not drink of the waters for they were bitter." It is said, however, that the juice of a plant thrown into them renders them drinkable. Dr. Robinson discovered a plant, the fruit of which ripens in June, and which is juicy and slightly acidulous, capable of correcting, by mingling, the bad qualities of the spring.

There are also in various parts of the world aperient, alkaline, acidulous, and sulphurous springs, the latter of which are hot. "The waters of many of the chalybeate springs frequently hold in solution so large a quantity of iron as to encase with a ferruginous deposit the channels through which they pass, depriving of their natural green the moss and grass which are laved by the stream, covering them with a yellow incrustation. The brine springs of Nantwich, which rise up through beds of rock-salt, are also so fully saturated as to yield an annual supply of upwards of forty thousand tons of salt. But of all mineral ingredients lime, combined with carbonic acid, occurs in the greatest abundance in springs, some of which are thermal. The deposition of calcareous matter takes place when the acid is dissipated in the atmosphere, and extensive formations are produced. So rapid is the precipitation of carbonate of lime at the hot baths of St. Vignone, in Tuscany, that half a foot of solid travertem of lime is the annual product near their source and the hot-waters of Hieropolis, a city now a site of desolate ruins, is equally productive."

There are also petrifying springs, the most remarkable of which in England is that at Knaresborough. It is called the Dripping Well, and will, in an exceedingly short time, petrify any substance placed under the droppings. The illustration represents a bird's nest in process of petrefaction with the eggs in it. This well is also celebrated on account of the beautiful scenery and the cave of Eugene Aram, which are in the neighbourhood. The Matlock springs are also celebrated for their petrifying powers. The petrefaction, however, of these springs is not a change of substance—a transformation of the substances into stone—but simply an investient or crust of the calcareous property of the water.

THE INTERNAL FIRES OF THE EARTH.

SECOND PAPER.*

In a former article on this subject, we set forth the general idea of the heated condition of the interior of the globe. We now propose to enter more into detail, and to illustrate, by facts, the proposition and arguments previously advanced. It is *only by a judicious accumulation* of established facts that any theory can be safely projected—the theory being the fruit of the facts, the result of an investigation of details, never taking precedence of the facts, or involving the necessity of twisting the latter in its behalf. Now, the first elements in such an inquiry are those details of structure observed in the crust of the earth, about which Geology has speculated and inquired so much, and elaborated such satisfactory conclusions. On making a section of the crust of the earth, we find the order of the rocks invariable, and the utmost regularity of arrangement prevails everywhere. There are twistings and contortions of the strata, vast mountain ranges, whose white tops kiss the firmament, and deep, dark, awful chasms into which the daylight never enters: and yet, in spite of this, it is perfectly true that the arrangements of the strata are as regular as the numbering of the pages of a book. Thus, referring to the subjoined section of the earth's crust, it will be seen that all the fire-formed strata lie at the foundation; then follow rocks formed by water, but crystallized by contact with the hot floor on which they were deposited; then follow sedimentary formations of an ancient date, which gradually become more modern as we ascend, until we arrive at the brown, fertile soil, or red gravel of to-day. Let it be understood that the *order* is uniform in all cases, the exceptions being apparent only and not real; as, for instance, where an older rock lies above a modern one, through having been forced there by a convulsion *since* the deposit of the latest. Here we come to the gist of the thing in these convulsions and changes of arrangement, which have occurred in past time, and still supply incident to the features of the present.

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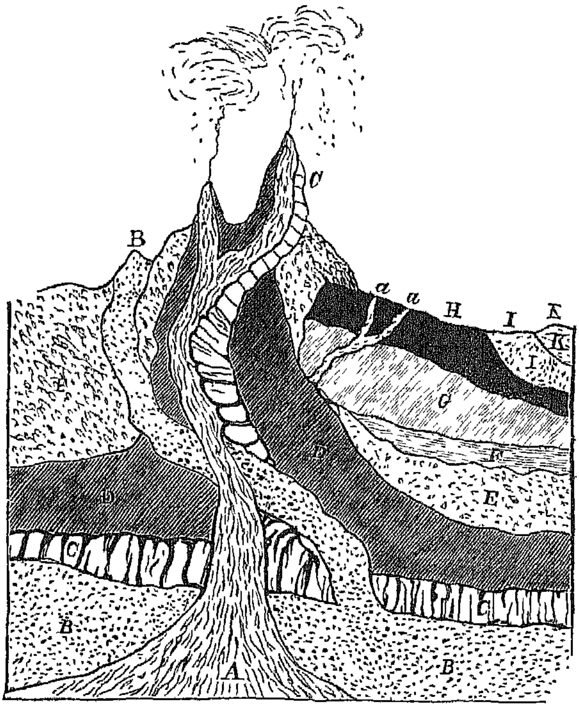
* For First Paper, vide Vol. I, page 304.



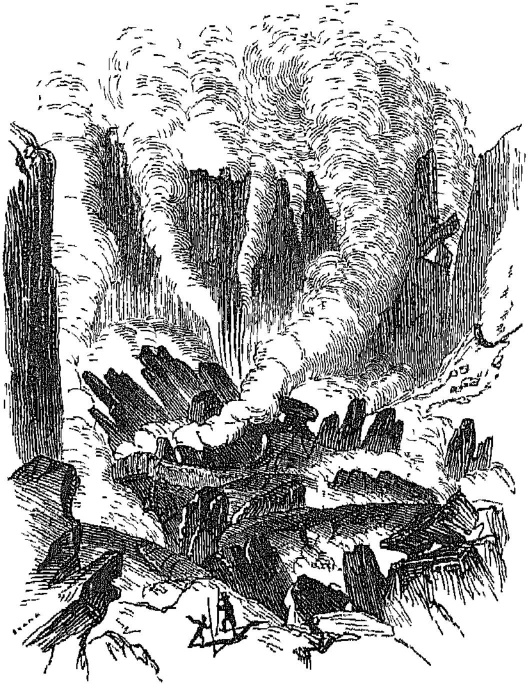
A Fluid matter supplying active volcanos. B Lavas, ancient and modern. C Basalt. D Porphyry. E Granite. F Mica Schist, the first sedimentary deposit. G Silurian, the first in which life occurs. H Carboniferous Limestone, containing coal and iron. I New Red Sandstone. K Tertiary and alluvium. *a a* Trap Rock ejected from the bed of Granite, E.

Now, in examining the lower beds, we find the minute arrangement of the rocks to be exactly such as would be produced under the action of intense heat, the particles being crystalline, and in such a state as they would appear in after fusion. Added to the crystalline character of these rocks, the veins of trap and metallic ore with which they are traversed, is still more striking. These veins traverse the rocks through which they pass at every possible angle, dividing and subdividing into arms and branches, and sometimes maintaining an uniformity of direction, all the divisions of the vein slanting in the same direction. In many of the trap rocks, this is very strikingly shown. Still more conclusive as to the igneous origin of these projected masses, is that of the burning of the coal through which they have passed, and no explanation is more satisfactory than that which refers these ejections of trap to a date subsequent to the deposit of the coal, the trap having risen through it, and converted it into coke. The immense field of anthracite, or natural coke, which occur in America, have been formed from coal scorched by heat since its deposit. The Cleveland basaltic wall, or dyke, affords a good instance in illustration of the ejection of the basalt having taken place subsequent to the formation of the surrounding strata, and which must have come to the surface in a heated condition. This dyke has a course of fifty or sixty miles, and extends from the west side of the county of Durham, across the Tees, and through the Cleveland Hills in the East Riding of Yorkshire, to the sea, between Scarborough and Whitby, probably entering the bed of the German Ocean. When this dyke comes in contact with limestone, the limestone is usually granular and crystalline—a form in which we know it is not deposited. When it crosses the coal strata, and comes in contact with seams of coal, the substance of the coal is, for several feet, converted into soot. At a greater distance from the basalt, the coal is reduced to coke or cinder, which burns without smoke, and with a clear and durable heat. Fifty feet away from the trap, the coal is found in its natural state. The formation of these dykes are easily referable to volcanic force. Before the confined vapour that afterwards issues through the crater finds a vent there, the surface of the ground in the vicinity of the volcano is frequently upheaved, and fissures of great extent are made, into which the melted lava is sometimes forced, which, on crossing, forms a wall or dyke, in every respect similar to a basaltic dyke. Such a vent was formed in 1794, during an eruption of Vesuvius; the length of the dyke being 2375 feet, and its breadth 237 feet; the material which filled it up was compact lava. Rents of the same kind have been found on the sides of Etna many miles in length.

To suppose that these basaltic columns and walls are the result of sedimentary deposit, is to strain at a gnat and swallow a camel; and to refer the forces, when they are admitted to be igneous, to the effect of chemical combination, is to commit an equal absurdity. That fire is, and was, the agent in producing such results, there can therefore be no further doubt.

It was assumed, in our previous article on the "Internal Fires," that at a depth of 100 miles, the earth was in a fluid state—the heat becoming less and less toward the surface. Such an assumption is not made vaguely, but after a careful analysis of facts. If it be true that the earth is fluid within, and that the trap rocks owe their ejection to a fiery impulse, not suddenly produced and temporarily acting, but permanently existing, and only temporary in its outbreaks: then every existing volcano, whether active or extinct, becomes a source of fresh evidence as to the nature and extent of the heat which the globe has entombed within it. What then are the facts of volcanos? They are such as lend an additional, and almost irresistible force to the argument, and remove all ambiguity from the philosophy of such a question. How are we to account for the continual emission of smoke from the crater of a volcano, except by supposing that a steady heat acts on the materials around it, and fuses and decomposes them? Some of these mountains are never without their wreaths of smoke; and, usually, long warning is given of the eruption of the melted lava. In addition to this, the most active volcanos are situated near the sea, just in spots where the water might occasionally percolate through to the molten fire, and cause the explosions which are so disastrous. There is but one volcano on the European continent, while there are twenty situate on islands. In America, there are eighty-six, nearly all lining the sea-coast; besides twenty-eight on islands. Oceana has about a hundred and forty islandic volcanos, and only seventeen on the continent of Asia. While in Africa, there are but two on the mainland, to nine surrounded by the sea. No advocate of Sir Humphry Davy's chemical theory can tell us why the chemical ingredients are more plentifully sprinkled on islands than on continents; but the advocate of the internal fires can explain, according to his theory, why such localities are volcanic, by adducing the simple and ancient antagonism of fire and water, which, in such a position, would have tenfold force, and tenfold opportunity of operation.

Certainly the most sublime example of volcanic wonder is, that of Hawaii, which is an island formed into an immense hollow cone, having an area of 4,000 square miles, and attaining an elevation of 16,000 feet. The whole of this island forms a pyramidal chimney over a vast incalescent mass burning beneath it, and also under some part of the bed of the surrounding ocean, having numerous vents through which the furnace below communicates with the atmosphere above. Lord Byron and a party of officers visited the crater Kilauea, and there witnessed a scene of horror. From the brink of the crater they looked down into a vast chasm of 1,500 feet in depth, and upwards of two miles in circumference. The edge was so steep, that by one plunge they might have descended into its lowest abyss. Within, it was agitated like the ocean:



INTERIOR OF A CRATER.

billow after billow tossed its monstrous bosom into the air, and the waves from opposite directions met with such violence, as to dash the fiery spray forty or fifty feet. The agonising struggles of this molten flood, the blazing fire, the roaring sounds, the huge hollow filled with writhing forms of light and darkness, formed a scene too terrible for human senses, and paralysed the mind with fear and wonder. There were in this crater about fifty cones of various sizes, all spitting forth their snake-like flames. Volumes of smoke and steam ascended from the abyss, and as evening broke, fire after fire gleamed torch-like through the coppery vapour. It is worth recording, that a convert to Christianity, wishing to subvert the superstitions of the Hawaiins, descended into this fiery deluge, and plunged a stick into the molten mass in the presence of her countrymen. Surely no reasonable person can doubt but that such a hell as this forms a direct communication with the fluid mass of which the globe consists.

"The kindred vengeance rears its dreadful head,
And all around Ëtnean terrors spread;
With dismal wings the crackling flames arise,
Shoot out their ruddy tongues, and lick the skies;
The airy region shines with hideous light,
And horrid day dispels less horrid night."

There are three chains of volcanos which stretch over the earth in definite lines, as if extensive cracks formed long ago, and perhaps during the consolidation of the crust, were now the natural vents for the superfluous heat from below, or accidental fissures for the admission of the water from the surface. The first of these ranges extends from Terra del Fuego, along the coast of South America, to 27 degrees south latitude, and during its course over 19 degrees of latitude, there is scarcely one degree free from volcanic vents. Here must formerly have existed an extensive crack—the crust must have fallen in from atmospheric pressure, or have been heaved up by subterranean expansion. In this range occur the volcanos of Chili, the chief of which is Villarica, which is always burning, and may be seen at a distance of 150 miles. A year never passes without violent earthquakes in this region. This chain turns off at Mexico, and embraces the isles of Revilagido to the west, and the whole of the West Indian islands eastward. In this link occur the Andes, with the majestic peak of Cotopaxi already described.

A second line of volcanos is that reaching from Alaska, the most western point of North America, in a westerly direction for 200 geographical miles, terminating on the coast of the

Kamschatdales. Earthquakes are most frequent along this line, and both the bed of the sea and the land have to submit to violent eruptions. The third chain traverses the whole of the southern part of the European Continent, and extends over 1,000 geographical miles. In this range occurred the earthquakes of Lisbon and Calabria, and the peaks of Etna, Vesuvius, and Stromboli, form permanent communications with the under stratum of lava. The old Greeks embodied the comprehensive truth on which we are now insisting, in a fable respecting Etna. They said that Typhon, a giant, was confined beneath Sicily, and his outstretched limbs reached as far as the Italian Peninsula, and there he fought and struggled with the incumbent rocks, and broke up the soil above him by his muscular convulsions.

The very fact of this geographical arrangement of volcanos, points out a common, instead of an exceptional, cause for their production. Why should these craters be arranged almost by rule and compass, except that they are connected with some vast series of fissures and hollows, from which the inner flames break forth, and save the globe from explosion? There are no chemical ingredients apparent in the rocks below these mountains, which might give rise to sudden combustions, and no compounds, which might have been formed by such chemical agents, are ever ejected with the lavas. So that, from the broadest view of the subject, we derive the lesson already set forth, that beneath the crust of the earth the materials are intensely heated, and that in all probability the interior of the globe itself is in a state of fusion from heat.

And it is a blessing after all. The fire is the force which heaves up mountain heights, and those mountain heights gather the snows, and attract the rain-clouds, and from their dreary summits flow fertilizing and refreshing streams, without which, the valleys and plains would be fruitless, and the lot of man dreary in the extreme.

ANECDOTES OF DOGS.

THE Dingo, or Australian Dog, is remarkable for his sagacity and extraordinary power of enduring pain. Even when beaten so severely as that life has seemed extinct, he has been known to get up and run away. It is related that a man proceeded to skin one, believing him to be dead, and after performing part of the operation, left the hut to sharpen his knife, when on returning, to his astonishment, he found that the poor animal was sitting up with the loose skin hanging over the side of his face. These dogs are wild, and apparently incapable of complete domestication. They worry the animals of settlers, and have been known to eat off the legs of sheep whilst alive. Domesticated dogs hunt and kill them, but always afterwards show great disgust, plunging themselves into water, as if to get rid of some contamination, or other disagreeable feeling, which contact with the Dingo had engendered.

The wild dogs of India are exceedingly powerful, and will even kill cheetahs and tigers, while those of Java, and further to the west, are capable of pulling down buffalos with ease. The whole canine tribe indigenous to South America, are represented as remarkably addicted to theft and secrecy, and were never known to make any kind of noise. In Turkey, Russia, Egypt, and also in beautiful Lisbon, "with her stately towers, her gardens, her churches, her deep blue sky, and her noble aqueduct, leading life's beverage to her exquisite fountains," dogs prowl about in packs, without any owners. In Lisbon, they lodge by day in the holes of ruins, and stroll forth to feed upon the refuse in the streets; and in Egypt, a French writer affirms, they are one means of perpetuating the plague, "for they uncover the carelessly buried bodies, and drag portions of flesh and clothing into the houses of the living." In some parts of Guinea, dogs are a favourite dish, and regularly bred for the table; and so keen is the appetite of the inhabitants for this species of food, that it is almost impossible for an European to preserve an animal of this sort, however valuable.

The sagacity and affection of dogs is exceedingly remarkable. So extraordinary are some of the instances given, that it becomes difficult to deny them the power of reason. A gentleman in Edinburgh, one day walking in Princes-street Gardens, his foot slipped, and he fell, upon which his dog, of the Esquimaux species, immediately tried to lift him up by his coat. He was also very cunning, and when he ate, strewed his meat around him, to entice fowls and rats. He then laid himself down and pretended to be asleep, but no sooner did they come, than he instantly pounced upon them and devoured them. Dogs are well known to be remarkable for their knowledge of language; the very name of the bear pronounced in the hearing of the Esquimaux dog, excites his ardour. They are exceedingly strong. Captain Lyon found that three of them could drag him, on a sledge, weighing one hundred pounds, at the rate of a mile in six minutes. And four of them, yoked to a sledge, will draw two or three hundred weight of wood, with great facility, for several miles. The Newfoundland dogs in this service are so sagacious and willing as to need no driver or guard, but will proceed to the place directed; and having delivered their burden, will return to the woods, in the hope of receiving some food as a recompense for their labour. As we often see in our own streets, they seem to have a pride of employment, carrying baskets and other articles for miles together. And so faithful are they to the charge committed to them, that it would be a dangerous undertaking for any stranger to attempt to molest them.

Captain Brown relates that "a Newfoundland dog, kept at the ferry-house, at Worcester, was famous for having, at different periods, saved three persons from drowning; and so fond was he of the water, that he seemed to consider any disinclination for it in other dogs, as an insult on the species. If a dog was left on the bank by its master, and in the idea that it would be obliged to follow the boat across the river, which is but narrow, stood yelping at the bottom of the steps, unwilling to take the water, the Newfoundland veteran would go down to him, and with a satirical growl, as if in mockery, take him by the back of the neck and throw him into the stream."

A native of Germany, fond of travelling, was pursuing his course through Holland, accompanied by a large Newfoundland dog. Walking one evening on a high bank, which formed one side of a dyke or canal, so common in that country, his foot slipped, and he was precipitated into the water, and, being unable to swim, he soon became senseless. When he recovered his recollection, he found himself in a cottage, on the opposite side of the bank to that from which he had fallen, surrounded by peasants, who had been using the means so generally practised for restoring animation. The account given by the peasants was, that one of them returning home from his labour, observed, at a considerable distance, a large dog in the water, swimming and dragging, and sometimes pushing, something which he seemed to have great difficulty in supporting, but which he at length succeeded in getting into a small creek, on the opposite side to that on which the men were. When the animal had pulled what he had hitherto supported, as far out of the water as he was able, the peasant discovered that it was the body of a man. The dog, having shaken himself, began industriously to lick the hands and face of his master. . . . . Two very considerable bruises, with the marks of teeth, appeared, one on his shoulder the other on the nape of the neck; whence it was presumed that the faithful animal first seized his master by the shoulder, and swam with him in this manner for some time, but that his sagacity had prompted him to let go his hold, and shift his grasp to the neck, by which he had been enabled to support the head out of the water. It was in the latter position that the peasant observed the dog making his way along the dyke, which it appeared he had done for a distance of nearly a quarter of a mile. It is therefore probable that this gentlemen owed his life as much to the intelligence as to the affection of his dog.

These dogs are said to possess a sense of time. Mr. Bell relates an instance of this which occurred under his own observation. A fine Newfoundland dog, kept at an inn in Dorsetshire, was accustomed every morning, as the clock struck eight, to take in his mouth a basket, containing a few pence, from a certain place and carry it across the street to a baker's, who took the money and placed in its stead its value in rolls. Neptune always sedately returned to the kitchen with his charge. On one occasion, when returning with the rolls, a brother canine made an attack upon him, for the purpose of abstracting from the basket its treasure. Neptune quietly placed the basket on the ground, made a demonstration in favour of honesty, by punishing the thief, and then bore off his charge in triumph. What was equally remarkable in this case was the fact, that he never attempted to touch the basket on Sundays. A dog belonging to Mr. M'Intyre, of Edinburgh, would select his master's hat from a number of others; find any article which might be lost; take a card, mentioned by his master, from a whole pack; select his master's penknife from a number of others; and any particular article which he might be called upon to find, he would find it, although he would have to search among a number of others belonging to the same person; thus proving that he understood what he was required to do, and was not guided by smell. He used frequently to get pence given him, which he took to the baker's for bread. He had also the sagacity to hide his money, to provide against a rainy day. Often, when it was unlikely that he had received a present, he would bring home a loaf. This induced Mr. M'Intyre to request the servant to make a search. While this was going on, Dandie took no notice until she came near the bed, when he instantly interfered, and drew her from it. Mr. M'Intyre secured him, for he growled and struggled; and continuing the search, the woman found sevenpence-halfpenny under a piece of cloth. From this time the dog could not endure her, and in future laid by his store of cash under a heap of dust, in the corner of a saw-pit. One day he met one of his benefactors, who told him that he had not a penny in his pocket, but he had one at home. Some time after the gentleman had returned to his house, a noise was heard at the door.

It was opened, and Dandie showed himself, thus intimating that he had called for his penny. By way of frolic the gentleman gave him a bad one. The baker refused to give him a loaf for it, when Dandie at once returned to the house where he obtained it, knocked at the door, was admitted by the servant, laid the penny at her feet, and with an air of contempt, walked away.

Mr. Luke, in his excursions in and about Newfoundland, mentions a dog who was an expert fish-catcher. He would sit on a projecting rock for hours together, watching the water; and on a piece of cod-fish being thrown in, three or four heavy, clumsy looking fish, called *sculpins*, would swim in to catch it. The instant one turned its broadside towards him, he darted down, and seldom came up without the fish in his mouth. As they were caught, he carried them to a place a few yards off, where he would sometimes raise a pile of fifty or sixty in a day.

The swiftness of this dog, and its capacity to run at full speed for several hours together, might be illustrated by many interesting examples; some species being able to run for nine or ten hours at a stretch, tiring in the same time two or three horses. But sufficient has been said to excite the interest of the reader, and we must now pass to other topics.

THE ICE PALACE OF ST PETERSBURGH.

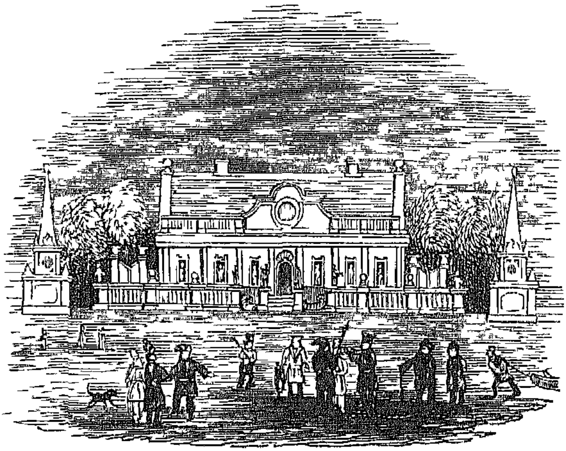
No quarry sent its stores
To enrich thy walls; but thou did'st hew the floods,
And make thy marble of the glassy wave.

The year 1741 was remarkable at St. Petersburgh for the inauguration of a new order of architecture, and for the adoption of a very unusual material for architectural construction. A "most magnificent and mighty freak" was perpetrated for the amusement of royalty, the satisfaction of the curious, and the wonder of the world; and this "freak" consisted in the erection of a huge palace formed entirely of ice, designed and erected at the wish and under the gracious auspices of the Empress Anne. In 1741, a "full, true, and particular account" of this remarkable undertaking was published at St. Petersburgh. The writer, in his warmth of admiration, bestows numerous and unqualified encomiums on the very noble, learned, and diverting Alexis Danilovitch Tatischev, who was the designer of the soluble edifice, and holds no very humble notions as to the merit of the work. From this meretricious production we gather that the palace was built at the expense of the Empress

Anne, and so excellent was it as a work of art, that the writer thinks it ought to have been carried away to the stars, and placed on a permanent foundation in the planet Satrrn, the temperature of which he thinks is sufficiently cold not to dissolve the structure. Such laudation is of course excusable in creatures of courts, and we turn from the writer's opinions to his facts which are the most valuable.

The Ice Palace was built for the amusement of the Empress, and in this respect was essentially a toy. It was first intended to build it on the river Neva, but after a considerable part of the edifice was raised, the ice on the river gave way, and the palace was recommenced on a piece of land between the fortress of the Admiralty and the palace of the Empress. The mode of building was simple. Blocks of transparent ice were cut from the Neva, and squared with rule and compass, and carved out with all the regular architectural embellishments. Each block was then raised to its place by machinery, a little water poured on the place where it was to rest, and then the block let down; the water immediately froze and the whole was thus cemented into solid walls. In this way the building became one entire piece, "producing," as the writer of the work remarks, "without contradiction, an effect infinitely more beautiful than if it had been built of the most costly marble, its transparency and bluish tint giving it rather the appearance of a precious stone." In appearance the building was very plain. It consisted of a façade divided into compartments by pilasters, and in each division was a window, the frame of which was painted to imitate green marble. The ice took the paint perfectly well. Instead of glass these windows were fitted with transparent blocks of ice, and at night were lighted up and adorned with brilliant and grotesque transparencies. The effect of these illuminations were very fine, as the light appeared not only at the windows, but through the semi-transparent walls of the entire building, giving it a pearly lustre of exquisite loveliness. The centre division was built in manner of a door, but was in fact a window like the others. An ornamental balustrade surmounted the façade of the building, and behind was the sloping roof with chimnies, in the usual style of Russian architecture. Between the balustrade and the palace a promenade was formed, and this was ornamented with ice-wrought orange trees in leaf and flower with birds perched on the branches.

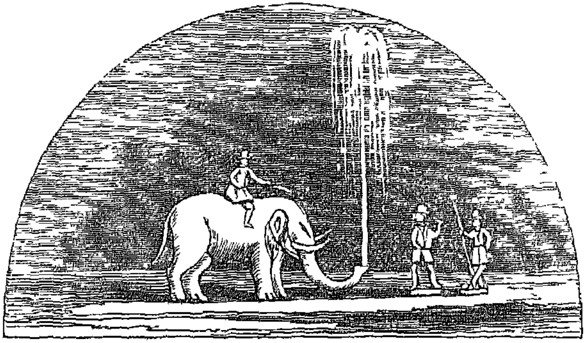
Before the balustrade stood six cannons, regularly bored, and mounted on wheel-carriages, the whole formed of blocks of hewn ice. These cannon were actually used, balls of hard



tar being at first adapted, but afterwards several iron balls were fired from them without their bursting, the balls piercing two inches in a strong plank at sixty paces distance In addition to these, there were two mortars of a size sufficient to carry eighty pound shells, and these were fired successfully with small charges of powder. On the same line stood two dolphins, also hewn in ice; and from the mouths of these, streams of inflamed naptha were caused to flow by means of concealed tubing.

Several other ornaments were displayed in the promenade. Two pyramids surmounted with globes, which were all hollow within, and could be entered by a doorway placed in the rear. A large paper lantern of eight sides, with quaint figures painted upon them, was hung up in the middle of each pyramid, and illuminated at night. A man was stationed withinside to turn about the lantern, and each of the figures presented itself in succession to the eyes of the admiring multitude.

On the left side of the building was placed an elephant of ice, mounted by a frozen Persian, holding a battle-axe in his hand. Two congealed Tartars with spears in their hands, were placed in front of the Persian. The elephant was hollow, and was made to throw water from his trunk to a height



of twenty-four feet. This was effected by means of tubes leading from the fons of the Admiralty, near which it stood. At night the water supply was cut off, and the elephant converted into a sort of dragon, or zoological and icy Vesuvius, by having burning naptha introduced into the water-pipes, which caused him to snort vast streams of fire, as if he were in anger with the Tartars, who stood a good chance of melting under his long-continued and fiery rage. To make still more terrible this exhibition, a man was placed inside the *body of the elephant, whose duty it was to make various* diabolical noises, and he performed his task in such a way, as to imitate occasionally the roar of an infuriated elephant. Not satisfied with these combustions of fire and water, or fire and ice, a bath was built outside, formed of round logs of ice, like the ordinary baths of Russia, and "this bath," says the writer, "was more than once actually heated and used."

The huge plaything was equally elaborate in its internal fittings, as in its external adornments. The entrance was behind, and the spectator was introduced into a handsome vestibule with a room on each side. These rooms were spacious and lofty, there being no ceiling below the roof. One of them was fitted up as a bed-room, and fully set out with dressing-tables, glasses, powder and essence boxes, jars, bottles, a watch, a pair of candlesticks and candles, all of ice; the candles were sometimes smeared with naptha, and set in a blaze without wetting. Then came the bedstead, made of the same chilly material, the bed, pillows, and counterpane, finely wrought curtains, and other furniture.

There was a fireplace built of ice logs, within which a naptha fire was several times ignited. The other room was fitted up as a dining room, with a large time-piece fitted with wheels of ice, which were visible through the transparent case. On each side were sofas and settees, handsomely carved, and two large statues were placed in the corners of the room, besides other furniture. In English measure this fabric was fifty-six feet in length, eighteen in depth, and twenty-one in height. The palisading was eighty-seven feet in length, and thirty-six in width, and the actual length of the front view, including the pyramids at the corners, was 114 feet. When the work was completed, the public were allowed unrestricted passage through it, a privilege which enabled some to delight in the toy, and others to lament the waste of public money which its erection involved. Among the pleas set up in defence of the toy, the filling of the imperial ice cellars with the blocks, when the palace begun to melt, was urged; but this must have been attended with expense contrasting strangely with the ordinary price of ice on the banks of the Neva. It was also said that the experiment had other results of a somewhat scientific nature, but these were merely the experiences of turning and boring the ice, and the firing of cannons made from it; curious experiences, perhaps, but of no value, and in this case purchased at an enormous cost.

An exaggerated, but very political account of this edifice is given by Cowper, in the "Task"—

"In such a palace Poetry might place
The armoury of Winter, where his troops,
The gloomy Clouds, find weapons; arrowy sleet,
Skin-piercing volley, blossom-bruising hail,
And snow that often blinds the traveller's course,
And wraps him in an unexpected tomb.
Silently as a dream the fabric rose;
No sound of hammer or of saw was there;
Ice upon ice, the well-adjusted parts
Were soon conjoin'd, nor other cement ask'd
Than water interfused, to make them one.
Lamps, gracefully disposed, and of all hues,
Illumin'd every side; a wat'ry light
Gleam'd through the clear transparency that seem'd
Another moon new risen, or meteor fallen
From heaven to earth, of lambent flame serene.
So stood the brittle prodigy; though smooth
And slippery the materials, yet, frost-bound,
Firm as a rock. Nor wanted aught within,
That royal residence might well befit,
For grandeur or for use. Long wavy wreaths

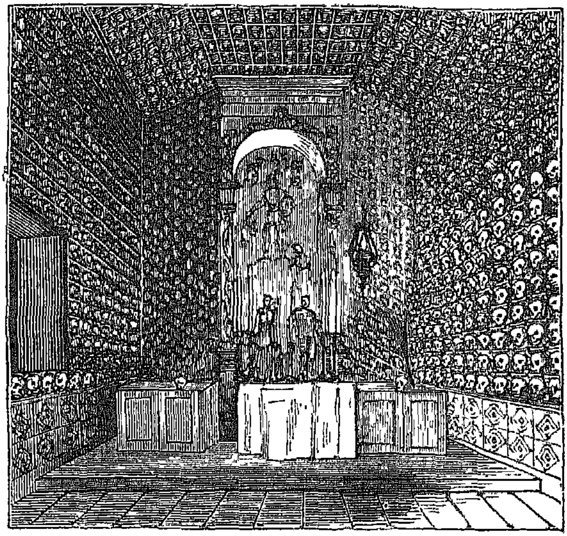
Of flowers, that fear'd no enemy but warmth.
Blush'd on the panels. Mirror needed none,
Where all was vitreous; but in order due,
Convivial table and commodious seat
(What seem'd at least commodious seat) were there;
Sofa and couch and high-built throne august.
The same lubricity was found in all,
And all was moist to the warm touch; a scene
Of evanescent glory, once a stream,
And soon to slide into a stream again."

This freak of the Empress Anne was repeated a few years afterwards on a different scale by the Empress Elizabeth. The experiment in this case consisted of a fast or show, half historical, half geographical, and formed a sort of masquerade of all nations. Many months previous to the *fête*, she sent orders to all the governors of the provinces, to send from each, to the noble city of St. Petersburgh, two couples of inhabitants, dressed in the costume of, and accompanied, belonging to, the climate of each place. The festival took place in the year 1754; persons came from above forty different nations, and frequented the streets of St. Petersburgh. There were Kamschatka in sledges, drawn by dogs; Laplanders in sledges drawn by reindeer; Bucharians on camels; Calmucs on oxen; Circassians on horses, and Indians on huge and heavy elephants. The marriage of the Empress's jester took place at this time, and the motley assemblage collected in the city formed a grand procession; the jester coming last, and personating Winter seated in a car of ice, and drawn by bears. The most curious part of the affair, however, was the gallery wherein each nation performed its own music, and danced its own dances, producing a confusion of discords, such as we sometimes hear of under the title of a "Dutch concert." Each nation had a dinner prepared and served up in its own style.

On the Neva was built a palace of ice, where all the ornaments were made of ice in perfect order; not only the furniture and chandeliers, but, as in the previous instance, the pieces of cannon, which fired salutes without bursting. The newly-married couple were conducted by the procession of natives to the palace, and there entertained with feasting and music. This "freak" deserves more commendation than the other, inasmuch as it enabled the Empress to see the different manners and customs of the peoples whom she governed; and served as a medium of national greeting, which bound together more securely the various elements of the empire, and was long remembered with pleasure.

There is no people to whom the sports of winter seem more acceptable than the Russians; and there are none who enter with more ardour into the details of these customs and festivities. The winter at St. Petersburgh is very severe; the ice of the river consolidates every year by a certain time, and is then capable of bearing burdens which to us appear incredible. Thousands of armed men are called out to amuse the nobility; cannons and mortars are discharged; fortresses of ice and snow are erected, besieged, and taken; and no end of sham fights and manœuvres performed. The "Ice mountains," which are built every winter, exhibit, in a wonderful manner, the intensity of the frost, and the love of the people for such hardy adventures. The "Ice mountains" are inclined planes of ice formed on beams, often seventy feet high, down which the sledge is conveyed with a quickness almost like lightning: they are found not only in cities, but in villages, and even in *private gardens; and the ball-room is frequently deserted, for* the sake of a slide down the ice mountain. A flight of steps leads to the top, from whence the passenger rapidly descends. To make this diversion more easy and agreeable, there are large chairs fixed on skates, these being guided by a man standing behind, who is also provided with skates. The amusement is much liked by the Russian ladies, as well as others. Clad in their pelisses of costly fur, they brave the cold with a heroism which surprises persons from more southern regions. At night, the ice-mountains are illuminated with coloured lamps; and the reflection of this mass of variegated light from the snow, greatly heightens the beauty of the scene. The nobility and gentry drive about in superb sledges; and Catherine the Second was often seen on such occasions among her people A very large, rich sledge, was made for the purpose, capable of containing the whole Imperial family; to this were attached by chains, fourteen or sixteen smaller sledges, following in pairs for her Majesty's suite, the whole line of sledges being drawn by twelve or fourteen horses.

Such amusements spring from the adaptation of a people to the climate, in which they are born, and frequently appear incredible to those whose experiences have been acquired under different climates and habits. The capability of the climate of St. Petersburgh for such displays of excentricity, may be very well understood, by comparing the temperatures respectively observed in that city and in London, in the year 1748. At St. Petursburgh, the thermometer fell to thirty degrees below zero; at London it fell to eight below zero. So that at the former place, the cold exceeded the latter by twenty-two degrees. As we become acquainted with these facts, and acquire more intimate knowledge of the habits of various nations, we become more liberal in our views of society, and more enlightened in our judgment of the world; so that we are in no danger of making such a mistake as that made by the King of Siam, who, on hearing from a Russian ambassador, that fêtes such as we have described are yearly performed on the ice, charged him with falsehood and deceit, and threatened to decapitate him for such an attempt on his credulity.



THE CHAMBER OF SKULLS AT FUNCHALL.

On the island of Madeira there are many curiosities, most of them having some connection with the convents or churches. One of these is the Chamber of Skulls, in the town of Funchall, which is the chief curiosity of the Franciscan Convent there. The cathedral is said to be built of cedar wood, with which the island abounded at the time of its first occupancy by the emissaries of the church. Some curious fortresses, and several interesting streams, which flow through the streets of the town, are also pointed out to strangers. The Franciscan Convent, however, merits particular notice, on account of the strange exhibition of the mortal remains of humanity, which one of its rooms presents. This chamber is large and lofty, and well fitted for the ghastly spectacle which it presents. All round, from the ceiling to the ground, except in a space directly opposite the door, are rows of human skulls, with their horrible eye-sockets mocking humanity with death-like glances, and their bony jaws eternally grinning, as if tickled into laughter by the pallor of the spectator. The skulls are all singularly perfect, and almost uniform in colour, an unusual fact in relics of this kind, which generally range from an ivory white to a churchyard brown, according to the position in which they may have been placed since death—in the wet mould of the common grave, or the tight leaden coffin of the rich man's vault. The skulls are arranged in a curious manner, so as to alternate with an assemblage of stark thigh-bones, doomed to walk no more, which cross each other obliquely, and form a sort of parody on the well-established "skull and cross-bones." In the vacant space opposite the door, is a large picture of very mysterious aspect, which conveys no very definite idea; and which the old monk who attends you knows no more about than one of those fleshless and jabbering skulls. Judging from the name of the place, the chief figure in the picture may be supposed to be St. Francis; and making a further guess as to the occupation of the saint, he seems to be—or the pious painter would doubtless wish us to think so—in the act of weighing a sinner againt a saint. Certain it is, that a huge figure, not burdened with many of the details of perspective, stands very high up—upon nothing—and holds out one hand with a balance, in either scale of which sits a human being—one of the said human beings being much heavier than the other. Which of the two thus poised in the balance of everlasting happiness or woe is the sinner, and which the saint, is still more difficult to judge. As we weigh goods to ascertain their value, perhaps the heaviest of the two is the saint, and yet one would think that a sinner would sink the lowest, as that is already his destination.

Nevertheless, here is a chamber of skulls, and a frightful exhibition it makes. All the skulls,—so says the officiating monk—are those of pious men, the bones of none but the holy finding a home here. A lamp, not of the cleanest, swings from the ceiling, and throws a pale light on the cranial individualities. Here is the brain case—deficient in the bump of cautiousness—of a holy father, who attempted to cross a mountain torrent when the waters were high, in order to reach a village, where a rich planter was about to breathe his last, and who failed in the attempt and was drowned. Here is another, who fasted all through Lent, and then died of lock-jaw; and one merits particular attention, from having covered the satanic brain of a wealthy planter, who turned a deaf ear to religion all his life; and having no friends to whom to bequeath his wealth, gave the whole to the convent an hour before death, and so saved himself from perdition. If you listen to the showman, you may hear hundreds of such histories; "sermons on skulls" being in this case as plentiful as the skulls themselves.

A convent of this kind, which educates a vast number of youths of both sexes, deserves to be treated with some degree of respect; but in this case we can hardly be so serious as we could wish: for it is pretty well known that this chamber of skulls has been got up as a show; and that instead of depending on the life contingencies of holy fathers, they have obtained the skulls of heretics and strangers, without any regard to the claims of persons to such distinguishment after death. As a collection of relics, therefore, this chamber has but few merits, the skulls being essentially a collection made at random; but as a wonderful assemblage of such strange objects, and a most wonderful spectacle to the uninitiated, it certainly merits the attention we have bestowed on it.

THE ALPS.

Who first behold those everlasting clouds,
Seed-time and harvest, morning, noon, and night,
Still where they were, stedfast, unmovable;
Those mighty hills, so shadowy, so sublime,
As rather to belong to heaven than earth—
But instantly receives into his soul
A sense, a feeling that he loses not,
As something that informs him 'tis an hour,
Whence he may date henceforward and for ever.

ROGERS.

IT would form an epoch in any man's lifetime, to stand for once upon the lofty brow of snowy Blanc, or to climb the rugged steeps which rise from the vale of Chamouni. Blanc, of which Rogers, Byron, and Shelley, have written in such nervous tones; Chamouni, in whose deep defile one has sung with a song suited to the harp of a prophet, as he sat in the shadow of the granite steeps, his heart filled with adoration, and his eye lifted to heaven—

Hast thou a charm to stay the morning star
In his steep course? So long he seems to pause
On thy bald awful head, O sovran Blanc!
The Arve and Arverion at thy base
Rave ceaselessly; but thou, most awful form!
Risest from forth the silent sea of pines,
How silently! Around thee and above
Deep is the air and dark, substantial, black,
An ebon mass: methinks thou piercest it
As with a wedge! But when I look again,
It is thine own calm home, thy crystal shrine,
Thy habitation from eternity!
O dread and silent mount! I gazed upon thee,
Till thou, still present to the bodily sense,
Didst vanish from my thought: entranced in prayer,
I worshipped the Invisible alone.

The highest mountains in Europe are the Alps, which spread over Italy and Switzerland in various directions, extending westwardly into France, and having a connecting link in the Cevennes, with the great chain of the Pyrenees, which separate France from Spain. One of the summits of the Alpine range enjoys the reputation of being the highest mountain in Europe, and ranks among the highest in the world. The length of the Alps is about four hundred and fifty miles, measuring from Mont Blanc to near Vienna. The Alps are of the oldest geological formation, and lift their granite heads far above the clouds, their huge sides flanked by rocky masses and defiles, and their slopes alternating with green beds of velvet softness and sterile plains, while the dark green pines climb up from their feet, and fringe with solemn verdure the grey slopes and steeps, leaving the white heads of the mountains uncovered, that they confront the sky, worshipping

MONT BLANC.

The "sovran" of the Alps is situate in the centre of the range, and is an enormous mass of primitive rock, rising to a height of 15,760 feet above the level of the sea, and visible at a distance of 150 miles. This mountain derives its name from its summits and sides being so thickly and permanently clothed with snow, without any rocky or verdurous interventions to break up the glare of the intense whiteness which gives this mountain a venerable pre-eminence as a patriarch among the hills. The form of the mountain is that of a pyramid, as seen from the north and south; but from the vale of Chamouni, it looks like the back of a dromedary, and hence is sometimes called by the natives, *Bosse de Dromedaire.*

"On a beautiful serene summer evening," says Dr. Clarke, "we walked up the hill from the town of Neuchatel to La Rochette, a charming villa overhanging the lake. Standing here on the terrace walk, surrounded with exotics of gayest tint and sweetest fragrance, we gazed for the first time on the hoary monarch of the Alps. You look down over a green vineyard, and a poplar colonnade, on the blue surface of the lake; beyond, rise the green swelling hills of the opposite shore, and then, far above, the eye roams along a snowy range of Swiss and Savoy Alps, extending more than 100 miles in the sweep of the distant horizon. The sun gradually descended behind the Jura: we watched in silence the shadow of the horizon spreading slowly upwards from peak to peak; and when all the less lofty mountains were clad in sober grey, still the colossal summit of Mont Blanc remained conspicuous, like a bright cloud detached from the earth, and glowing with a warm roseate hue in the last rays of sunset. The first view of this splendid panorama is certainly one of the strongest, most expansive, and most delicious sensations of life. The illuminated dome of St. Peter's, as seen on a still night from the Pincian hill, brilliant and majestic as it is, has yet nothing like that deep impressive hold upon the memory. If we were looking for a simile to convey some faint notion of this peculiar glow of the mountain at sunset, might we not feebly express it by saying, that you seem to look at a huge hill of Bologna phosphorus, glowing with mitigated light on a cloudy day?"

This luminous appearance of Mont Blanc is noticed by most writers. Goëthe, in describing an evening approach to the Vale of Chamouni from Geneva, says, "It became darker . . . . only the greater masses were visible. The stars one after another rose; and we observed over the summits of the mountains, a light which we could not understand. Clear without lustre, like the Milky Way, yet denser—almost like the Pleiades, but greater—it long had our attention, until at last, as we changed our position, like a pyramid, pervaded by an inward mysterious light—most resembling the brightness of a glow-worm—it projected over the tops of all the mountains, and made us certain that it was the summit of Mont

Blanc. The beauty of this sight was most extraordinary; for, as it shone with the stars that stood around it—not, indeed, in equally vehement light, yet in a broader, more connected mass—it appeared to the eye to belong to a higher sphere, and it required an effort to conceive its base fixed to the earth."

From the Col de Balme the aspect of Mont Blanc is the most sublime. "Placed in front," says Simard, "and about mid-height of Mont Blanc, and therefore at equal distances between the summit and the base, sufficiently far to embrace the whole at one glance, sufficiently near to distinguish every detail, we saw this stupendous object like a full-length picture hung up there for our pleasure and information; when we began to ascend the Breven, and half way up to its châlet, we could not turn round and look at Mont Blanc, *without experiencing the terrific sensation of its falling down over us.* Several of our party made use of this expression, at the same time averting their eyes in terror, which shows how general and how strong the impression was; but as we ascended higher it ceased."

To ascend Mont Blanc has been the ambition of several eminent adventurers and men of science. The earliest attempts were owing to the encouragement of the eminent naturalist Saussure, who, in 1760, animated by a noble zeal for science, caused it to be made known throughout the valley that he would give a considerable reward to any one who *should succeed in attaining the summit, and even supplied* daily wages to those who engaged in the task unsuccessfully. In 1762, the first two attempts were made by Pierre Simon of Chamouni, and in 1775, M. Couterau and three guides again attempted it.

Couterau and his party set out on the 13th of July, and passed up the mountain of La Côte into a great snow valley, which appeared to lead directly to the summit. But though everything seemed favourable, they failed from sheer exhaustion, owing to the white glare of the snow, the heat of the sun, and the languor and distaste for food, induced by the close still air of the mountain.

Another attempt was made made in 1783, by three guides of Chamouni, who set out in the same direction that Couterau had taken; but after reaching a great height, one of them was seized with a desire to sleep which he could not resist, and the others, knowing that he would perish of a sun-stroke, if left to sleep on the snow, retraced their steps, and relinquished the enterprise. They were all excessively oppressed by the heat, which Saussure notices as being very astonishing at so great a height; they had no inclination for their provisions and wine. "One of them seriously told me," says Saussure, "that it was useless to carry any provisions on this journey; and that if they had to go again, he would take nothing but a parasol, and a bottle of scent. When," adds the naturalist, "I imagined this great and robust mountaineer ascending those snows, holding in one hand a parasol, and in the other a bottle of *eau sans pareille*, it appeared so strange and ridiculous, that nothing could have presented more forcibly the difficulty of this enterprise, and consequently the absolute impossibility of success for men who have neither the head nor the legs of a good Chamouni guide."

After several attempts more or less bold and enterprising, a young man, named Balmat, who happened to lose his way in searching for minerals, and being overtaken by night, was compelled to pass the night on the mountain at an elevation of twelve thousand feet, the next morning discovered a route which seemed to afford the long-desired access to the summit. Returning to the valley in a state of extreme exhaustion from a night's exposure to the thin mountain air, he was attended by Dr. Paccard, to whom he communicated his fortunate discovery. The doctor set out on the 7th of August, 1786; and after passing the night on the Glacier des Bossons, set off at four in the morning for the summit. Having reached a great height they began to experience the effects of the intense cold, and had to fight against fierce winds under the most oppressive fatigue. At length the summit was reached, and they stood on a spot where man's foot had never rested before, and gazed down on the sublime scenery of the surrounding mountains. The eyes of many in the valley here followed them by the aid of telescopes, and the whole population of Chamouni came out to catch a glimpse of them. They remained on the summit no longer than half an hour, the cold being so intense, that their provisions were frozen in their pockets, the ink congealed in their ink-horns, and the mercury in Fahrenheit's thermometer sunk to 18½°, or 13½° below the freezing-point. They had employed fifteen hours in ascending, and though they regained the mountain of La Côte in five hours, yet they found great difficulty in descending, their sight being debilitated by the reflection from the snow. They arrived at La Côte about midnight, after twenty hours of unremitted fatigue. Having reposed themselves two hours, they again sallied forth, and returned to Chamouni at eight in the morning. Their faces were excoriated, and their lips exceedingly swelled; Dr.

Paccard was almost blind, and his eyes continued to be affected for a considerable time. The king of Sardinia made Balmat a present, and a small subscription was subsequently raised for him; he was honoured also with the familiar appellation of Mont Blanc.

The most memorable ascent was that made by Saussure, in 1787. As soon as the philosopher heard that a practical route had been discovered, he lost no time in repairing to the summit, in order to perform those scientific experiments for which he had waited for an opportunity thirty years. He passed the first night on the top of La Côte, in a tent previously constructed for that purpose. At four o'clock the next afternoon they reached an altitude of 9,312 feet above the valley, or 12,762 feet above the level of the sea. Here they encamped for the night, and formed an excavation in the hardened snow, which they covered with their tent. In this icy habitation, instead of suffering from the cold, Saussure felt such a suffocating heat from the closeness of the tent, and the number of persons crowded into so small a compass, that he was frequently obliged to go into the open air in order to breathe freely. The next morning the whole company resumed their journey at seven o'clock, and found the ascent in some places so steep, that the guides who preceded were obliged to hew out steps with a hatchet. At eleven they reached the summit of Mont Blanc. The whole party had been seen by the people

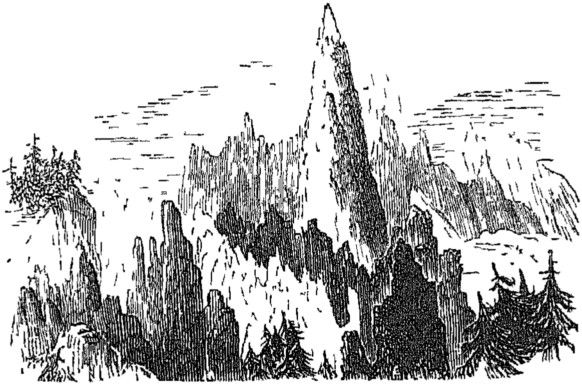
APPROACH TO THE GRANDS MULETS.

of Chamouni as they approached the last heights, and all the bells in the village were set a ringing as the topmost point was attained.

Saussure remained five hours and a half upon the summit, and occupied the time in experiments with the barometer and thermometer, and in other investigations of a scientific nature; and after another night spent on the mountain, he returned to Chamouni early the ensuing morning. In the autumn of 1834 Dr. Barry ascended, passing by chasms of unfathomable depth, towers of ice, caverns of almost crystal walls, splendid stalactites guarding the entrance. His principal guide had been up eight times before, the survivor of four who had been swept away by an avalanche when assisting Dr. Hamel in ascending in 1820. One of the most brilliant of recent ascents was that made by Albert Smith in 1851, which was effected at considerable risk, but crowned with the romantic realization of a fine view from the summit.

One of the most picturesque of the elevations of the Alps is the

AIGUILLE DE DRU,



Which is a wild spire-like, pyramidal peak, notched on it sides, and rising in a conspicuous manner from the glacier which surrounds it. The Aiguille de Dru is a fine object seen from Chamouni, as its sharp cone of granite cuts the blue sky and stands prominently forward upon a background of misty horizon. It reaches the height of eleven thousand feet above the level of the sea, the upper part forming one continuous shaft of more than four thousand feet, gradually tapering to a point, and perfectly inaccessible. The sides are rounded and said to have a polish like glass. "It appears," says Mr. Bakewell, "to be composed of perpendicular plates of granite. By what means it has been shaped into its present form it is difficult to conceive. When approaching the Glacier de Bois, it is impossible to view without astonishment this isolated peak of granite shooting up into the sky to such an amazing height. I have neither seen nor heard of any pinnacle of granite in the Alps that can be compared with it for the elegance of its form, or for the length of its shaft."

As the excursion to the summit of Mont Blanc cannot be performed in less than two days, it is necessary to fix upon some spot on the mountain at which the party may spend the night during which they are out on it. A favourite spot for this purpose is the

GRANDS MULETS ROCKS,

Which are elevated eleven thousand feet above the level of the sea, or less than five thousand feet below the summit of Mont Blanc. The approach to these rocks is along the surface of a huge glacier, the surface of which glistens with a bluish light and affords no safe footing for the adventurer. With the shod pole the traveller picks his steps cautiously, with a steep ascent on his right hand, and a sharp, and almost perpendicular declivity on the other. If he make one false step, he is likely to slide along the ice till he reaches its edge, and then fall several thousand feet into a black cauldron filled with stones and snow water, and there his flesh will be eaten by the lammergeyer, and his dead bones may be bleaching for centuries, unless the alpine mosses cluster round them, and form for them a tomb of verdure. Over some of the narrow ledges he must walk sideways to keep his balance, and frequently stand on one foot tottering between Mont Blanc and eternity. He meets with abysses which must be crossed by laying poles over them; others must be crossed by natural bridges of snow, which may be safely accomplished if they do not give way like bridges of fog the moment he approaches them, in which case one crawls over on the thin coat of ice which has formed under the snow, and the others are got across by ropes. Up the steep sides of a glacier the adventurers have to cut steps with a hatchet, and the traveller, in ascending these, frequently slips and rolls to the very edge of the precipice. In addition to these perils, the avalanche is so frequent that it is many chances to one that he should be buried under one of them; for the slightest noise, or a loud laugh, will frequently cause sufficient vibration to disengage one and precipitate it from its hold.

The Grands Mulets is not often used as a sleeping-place the first night. Dr. Clarke slept there, though at considerable risk, and with no great assurance of success, when one of his guides waggishly told him that they might next morning quietly walk down again—a termination of the journey which frequently happens. The preparations for the journey include strong coarse clothes, shoes studded with iron nails, gaiters, green spectacles, and veils to shade the eyes from the glare of the snow. "Other articles," says Mr. Jackson, "necessary to be taken, were two blankets, a large sheet for a tent, a saucepan to dissolve the snow for water, ropes about fifteen feet long to secure each other in dangerous places, a hatchet for cutting steps in the ice and frozen snow; and for each of us a pole about six feet in length, with a spike in the end." Cold fowls, vin ordinaire, brandy, cheese, and bread, make up the cheerful side of the account in the provisions for an ascent.

The route lies along a lonely valley towards Pelerius; there it quits the valley and ascends the mountain by the southern end over the Glacier des Bois. Then the path leads through a noble forest, where the pine trees stud the cliffs like masts upon a rocky bay, their green heads contrasting with the white hills of snow, and their ocean cones rattling with every breeze into the gullies and ravines. Here and there are little mountain meadows, where a few mosses, centuries ago, had begun to colonize the mountains. Here mould has collected and rich tufts of grass and moss are woven together in a soft velvet-like texture, cheering the traveller with their smile of promise. In the hollows and little crevices around this spot he discovers numerous mountain flowers, auriculas and campanulas, all blooming, fresh, and fragrant, and beautifying the solitude with their cheerful colours. The blue gentian often peeps out of a wall of crystal, and its azure bells nod to and fro in the stillness, as if the mountain air was standing still to hear it chiming. Sometimes a whole bed of these lovely flowers peeps out from a dark gulley, and the traveller sees them blooming in a little paradise of their own—a nook all moss and quietude—and as they spread in this inaccessible hollow, and put out hundreds of their azure blossoms all alone, it looks as if a bit of the blue heaven had fallen, and had taken home for ever in this wilderness to cheer the heart of the adventurer.

Leaving this spot the route passes over a rough rubble, steep and troublesome; and the mules climb the height with difficulty. The Châlet de la Para, the last human habitation, is now reached, and a lonely scene opens on the view. "At the north-eastern extremity of the valley before us rose the lofty green passage of the Col de Balme, then came the red, craggy, thunder-smitten pinnacles of the Aiguilles Rouges (the Acroceraunia of the valley), then directly opposite to us the long fine woods and bare broken summit of the Breven; then, turning a little round, the bold calcareous turrets of the Aiguille de Variens, partly covered by a low mass of white cloud. Then came the green hills closing the other end of the valley of Chamouni. Looking directly downwards, you saw under your feet the dark pine woods at the back of the mountain, intersected by the white stony torrent that had burst itself several channels to form the Arve. Then further on, numerous brown châlets, dispersed irregularly among the parallelograms of yellow corn, or green hemp, or flax, or clover. A little further the clustered village of Chamouni, and the light tin-covered spire of the church. Turning your back on the village, and rising a little from the valley, you have a long line of tall thick dark green pines, forming a most beautiful background to the white icy pinnacles of the rugged Glacier des Bossons, which projects far down into the smiling vale beneath. Then higher up you find above you the Aiguille du Goûté, and the huge bulk of the Dome du Goûté shining like polished silver in the morning sun; and still higher, and directly over head, the snowy pinnacles of the monstrous Aiguille du Midi; its base covered with ice, and lower down with moss, heath, juniper, rhododendron, &c."

As the traveller ascends, he comes to the foot of an immense buttress, called the

AIGUILLE DU MIDI,

Which overhangs the Glacier des Bossons. This pinnacle rises sharp as a spear out of a region of "thick-ribbed ice," where the pine trunks pierce the clouds or lay prostrate in ruins. Huge masses of crystallised rock lie piled up in glorious disorder, and icy towers, some of them hundreds of feet high, stand up as if to oppose an eternal barrier between the topmost heights and the green valleys below. When the sun shines, a thousand sparks and flames shoot from crag to crag as the fierce sunlight, reflected from a thousand sheets of purest snow, plays upon the spiracles of crystal. All round rise the spires of granite, bald and polished, with no verdure to clothe them, not a tree to relieve their dreary colours, the companions of mists, snows, silence, and desolation.

"Their silent presence fills my soul,
When to the horizontal ray
The *many tinctured* vapours roll
In evanescent wreaths away,
And leave them naked on the scene,
The emblems of eternity,
The same as they have ever been,
And shall for ever be.

"Yet through the valley while I range,
Their cliffs like images in dreams,
Colour, and shape, and station change;
Here crags and caverns, woods and streams,
And seas of adamantine ice,
With gardens, vineyards, fields embraced,
Open a way to Paradise,
Through all the splendid waste.

"The goats are hanging on the rocks,
Wide through their pastures roam the herds;
Peace on the uplands feeds her flocks,
'Till suddenly the king of birds
Pouncing a lamb, they start for fear;
He bears his bleating prize on high;
The well-known plaint his nestlings hear
And raise a ravening cry.

"The sun in morning freshness shines;
At noon behold his orb o'ercast;
Hollow and dreary are the pines,
Like distant ocean moans the blast;
The mountains darken at the sound,
Put on their armour, and anon,
In panoply of clouds wrapt round,
Their forms from sight are gone."

"We proceeded," says Mr. Auldjo, "by a narrow footway, or ledge, in the face of the cliff, in some places perpendicular and in others overhanging the abysses below. This track is partly natural, but in some places improved by the people of the valley; and a tolerably accurate idea of it may be formed by imagining, that against a precipice, of some hundred feet in height, a wall of two feet thick was built about half way up, and the path consisted merely of the space on the top of the wall, which was frequently so narrow, that we were under the necessity of advancing sideways with our faces towards the rock, because the ordinary breadth of a man's shoulders would have thrown the balance of his person over the edge of the precipice. The track was also slippery and covered with loose stones, the crumbling materials of the decaying rock around points of which we sometimes wound, now climbing, and then with greater difficulty descending, or rather letting ourselves down from one pinnacle to another; so that this part of our journey, though less perilous than our subsequent ascents and descents in the icy precipices of the glaciers, was yet sufficient to try the nerve of a novice, and to require the utmost caution in the movement of even the most experienced of the guides."

One of the choice exploits of travellers who do not shrink from the fatigue, is to visit the source of

THE ARVERION,

Which issues from the Glacier des Bois, through a large arch of snow. An immense cavern, cut by the hand of Nature in the middle of an enormous rock of ice is the point from whence this river issues, and as it emerges into the light, it is seen to flow with great impetuosity, rolling in its waves vast rocks of ice, and covered on every side with foam. The entrance to the cavern is an arch of snow more than one hundred feet in height, and above this rise pyramids of ice, in the midst of which rises the obelisk of *Aiguille de Dru*, its summit lost in the clouds: the whole picture being framed by the magnificent forests of the Montanvert and Buchard, which rise with the glacier till its summit is confounded with the sky. Some persons have entered the cavern, but it is a rash attempt, as large fragments of ice are constantly falling from the roof. There is a story told of a young man who imprudently fired a pistol in opposition to the guides, for the purpose of observing the effect of the explosion. The concussion detached from the roof of the cavern a large block of ice, the fragments of which arrested the course of the stream. At length the accumulated waters burst through this barrier with a loud noise, sweeping along with it fragments of ice. The party had placed themselves, as they thought, in security, upon a small island; but the young man whose imprudence had occasioned the catastrophe lost his life, and his father had both of his legs broken. The Arverion receives the drainage of the surrounding hills, deriving its supply by the melting of the snow during summer: in the winter the stream is either very small or altogether ceases flowing.

Another hazardous expedition is that to

THE COUVERCLE,

A steep rock at the extreme end of the Mer de Glace. The prospect from the top of this rock is magnificent.

From the Couvercle Rock the traveller proceeds to the Glacier du Talèfre, around which, in a semicircular form, arise a number of peaks, entirely shut in amid ice and snow and barren crags, where all vegetation might be supposed to cease. But here the eye is startled at the sight of a small rock, clothed with grass and alpine plants—"an oasis in the desert"—a "fertile isle in the midst of a desolate ocean"—which is familiarly known as

THE GARDEN.

Saussure thus describes it. "A very singular bit of the picture is a flattened rock, situated, like an island, in the midst of the ice and snow of the Glacier du Talèfre. Its form is nearly circular, and it is a little elevated above the level of the glacier. The eternal hoar frosts which cover the whole surrounding region seem to respect this rock; they make no stay upon it, or at least they quit it much sooner than they quit the rest of the mountain. It is even clothed in a little verdure, which was only just beginning to break forth, the month of July being a season of early spring on these mountains, but at the end of August it is covered with a beautiful green turf, set off with a great variety of pretty alpine flowers. It is named *le Courtil,* which, in the language of Savoy, as well as in old French, signifies the 'garden.' It is even shut in like a garden, for the glacier has deposited around it a ridge of stones and gravel, forming an exact enclosure."

The creatures which inhabit these solitudes are peculiarly interesting. The chamois, with its light frame and tender expression, browses on the scattered patches of turf, and leaps from crag to crag in sport with his fellows. Eagles, falcons, and buzzards, nestle in the lofty pinnacles and on inaccessible ledges; and numerous crossbills, doves, and hard-billed birds, find shelter and food in the pine forests, or in the fertile passes lower down. Sheep and goats are tended by the mountaineers, and several small villages lie embosomed in the hills, like wild strawberries in the wilderness, where the goatherds and shepherds maintain small farms. The hunting of the chamois constitutes a favourite occupation with the mountaineers, who have robust constitutions and indomitable perseverance. The utmost watchfulness and patience are requisite on the part of the hunter. He creeps on from one rock to another, and lies motionless on the snow for hours, watching for his timid game—"breathing the thin air on the iced mountain top." Whenever he is near enough to distinguish the *bending of the horns* that is, about the distance of two hundred and fifty paces, he takes aim; but if at the moment of raising his piece the chamois sees him, he takes flight, and darts amongst the crags out of reach in an instant. No one but such a sportsman can understand the joy of him who, after so much toil, sees his prey fall. With shouts of triumph he springs to seize it, up to his knees in snow, despatches the victim if he finds him not quite dead, and often swallows a draught of warm blood as a specific against giddiness. A good sized chamois weighs from fifty to seventy pounds, and usually yields seven pounds of fat. The hunters have many "hair-breadth 'scapes," and frequently meet with fatal accidents when engaged in the chase. On the 14th of October 1822, two hunters, named John Fellman and Gabriel Schitts, were in eager pursuit of a chamois on the Finsteradhorn, in Switzerland, and both of them slipped down to a narrow shelf of a mountain, over a precipice of fearful depth. Behind them was an almost perpendicular wall of rock, up which it appeared impossible for any human being to climb. After remaining in this alarming situation for some time, one of them bent down, with his foot overhanging the precipice, so that the other might step on his shoulder and thus reach a small projection, by means of which he contrived to reach the top, and then let down a rope for his companion.

Such are some of the wonders of the Alps, whose hoary summits have for ten thousand years confronted the blue infinite heaven, the memorials of forces which have long died out, but which in their day played with these granite peaks as toys, and flung them up from a billow of fire in glorious sport, leaving them to congeal in the pure air, the abodes of silence, eternal winter, and sterility!

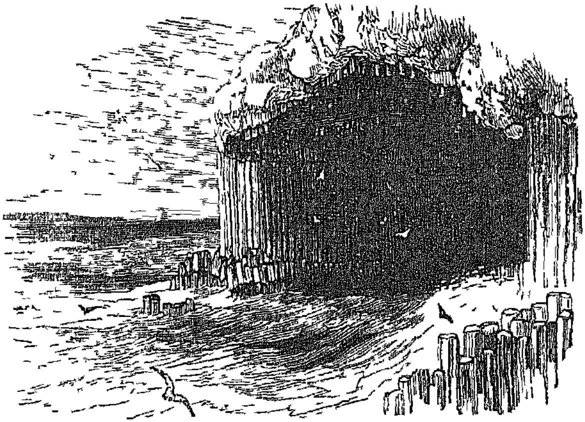
Ye everlasting hills!
Temples of God, not made with hands,
Whose Word performs whate'er He wills,
Whose Word, though ye shall perish, stands!
Can there be eyes that look on you,
'Till tears of rapture make them dim,
Nor in his works the Maker view,
Then love his works in Him.

MONTGOMERY.

CAVERNS AND GROTTOS.

The tumbling surge enfolds the strand;
Bespangled shines the yellow sand,
Your early footsteps to command,
Your pleasure to prolong.
Away! the fragrant fields in flower
Perfume the path to Allan's bower;
Where pealing mirth awakes each hour,
And rings old Marsden's rocky tower,
The bright blue waves among.

Caves and grottos afford strange instances of the marvellous, both in nature and in art The gloomy caves of ancient India, in which the voice of antiquity woke historical echoes, and the tenets of a wild faith were taught to worshipping millions, have still many features that strike the mind with awe, and fill the memory with solemn associations. With historical caverns, such as those of Elephanta, we have nothing here to do; they have been amply treated in an earlier portion of this work; but there are several natural grottos, chiefly wonderful for their natural features, which now require notice A cavern of any kind is a wonderful thing, and always seizes the mind with a poetic sense of



FINGAL'S CAVE.

solitude and grandeur, which the darkness, the rough picturesque outline, and frequently the huge dimensions of the cavity, help to increase almost to the verge of terror. The fantastic architecture and the torchlight, are also important elements in the interest which attaches to these places; and to these may be added the tales and traditions usually connected with the "bowels of the earth."

The first thing worthy of note is, that caverns are usually evidences of volcanic forces, and possess in the first elements of their existence characteristics vastly interesting to the lover of science. Some of the high lands of the globe are so hollowed and caverned out by volcanic action that the slightest vibration causes internal rumblings, as if the earth had an inward voice, and grieved at being trodden on. The immense table land of Quito, with the tremendous volcano of Jurillo, is an example of this: for in one night an immense dome rose up four miles in extent, and six great masses also appeared close by, having an elevation of from 1312 to 1640 feet above the original level of the plain. It is believed that a cavity of a mile and a half exists beneath the surface. Sometimes the land has subsided into these immense hollows, and villagers have gone to bed at night doomed never to wake in the morning; or if they have wakened, it was only to see themselves engulfed in the rocky jaws of mother earth, and to be overwhelmed in ruin instantly. Several miles of country in the Caraccas, fell in in this way, to a depth of 3040 feet, in the year 1799, and left the forest trees green under water. In the same year a portion of the country in Sicily, of three miles in circumference, sank thirty feet deep, and a similar event happened at Marseilles, in the year 1812.

Eruptions and subsidences of the same kind as those we are now accustomed to were the chief agents in old time by which caverns were formed. One of the most interesting of the volcano-formed caverns is

THE CAVE OF FINGAL,

In the island of Staffa, on the west-coast of Scotland. This is composed of immense basaltic columns arranged in most picturesque forms, and forming several separate caves of great beauty. Staffa is an immense mass of column rock of volcanic origin, and abounds in caves and grottos. It was visited by Sir Joseph Banks and Mr. Pennant, who both attempted to do justice to it by the pen. The greatest curiosity of Staffa is undoubtedly the Cave of Fingal. This cavern consists of a lava-like mass at the base, and of two ranges of basaltic columns resting upon it, which present to the eye an appearance of regularity almost architectural, and supporting an irregular ceiling of rock. "It is the most magnificent," says Sir Joseph Banks, "that has ever been described by travellers. The mind can hardly form an idea more magnificent than such a space, supported on each side by ranges of columns, and roofed by the bottoms of those which have been broken off in order to form it, between the angles of which a yellow stalagmitic matter has exuded, which serves to define the angles precisely, and at the same time vary the colour with a great deal of elegance. To render it still more agreeable the whole is lighted from without; so that the farthest extremity is very plainly seen from without, and the air within, being agitated by the flux and reflux of the tides, is perfectly dry and wholesome, free entirely from damp vapours with which natural caverns in general abound." The length of the cave from the rock without is 371 feet 6 inches; from the pitch of the arch it is 250 feet; the breadth at the mouth is 53 feet 7 inches; height of the arch at the mouth 117 feet 6 inches; height at the farther end 70 feet.

Faujas, in his description of the cave, says, that the sea is in a constant state of agitation within the cave, and breaks with fury against the sides and bottom. It happening to be sufficiently calm at the time of Faujas' visit to enable him to enter in a boat, he heard the delightful music for which the cave is noted, which issues from a recess just below the surface of the water, and is caused by the rapid passage of the water through hollows in the rock. In Gaelic the cave is called *Llaimh-binn*, the "cave of music," in allusion to the lovely sound which the rock emits. "The prolonged length, the twilight gloom half concealing the playful and varying effects of reflected light, the echo of the measured surge as it rises and falls, the transparent green of the water, and the profound and fairy solitude of the whole scene, could not fail strongly to impress a mind gifted with any sense of beauty in art or in nature."

THE GIANT'S CAUSEWAY

Is another wonderful basaltic structure. It is situated on the northern coast of Ireland, where a large tract of volcanic soil prevails. The causeway is a sort of pier, running towards the sea and terminating in a point, over which the breakers dash with violence. This pier composes the western boundary of a bay in the form of a crescent, surrounded by high and rugged ground, which exhibits some fine basaltic phenomena. The mass of columns which run into the sea are nearly on a level with the beach, and appear at a distance like a stone pavement. All the prisms which compose this wonderful structure are in contact with each other, and their mean diameter is from twelve to fifteen inches. Those with six sides are by far the most numerous. The basalts are of a blackish colour, and sufficiently hard to strike fire with steel. Near to the Causeway is a stupendous bastion entirely of basalt, which rises vertically to a height of 322 feet above the shore; the aspect of this is sublime and terrific, and fills the mind with wonder as to the nature of the forces which could have filled up such a solid height.

But it is not in the volcanic rocks that the best known and most extensive caverns occur. While fire has thrown up masses from below, to form the roofs and sides of these natural temples, the sea has also worked its part; and, in many instances, the structure of the cave is such that it is difficult to say which class of forces has had most to do with it. Water-formed caverns are very frequent in the limestone rocks; and few have more elements of wonder than

THE CAVE OF ADELSBURG,

Near Trieste. This is, as far as is known, the greatest cavern in the world. Deep abysses of 500 feet often occur in it, and explorers are frequently compelled to give up their attempts to ascertain its limits. The entrance resembles a fissure in a rock caused by an earthquake. Visitors are always conducted with torches, without which it would be impossible to make any progress. The cave is most wonderfully arranged, and might be supposed to have been planned by some potentate of unlimited resources and boldness of design as a subterranean retreat. Immense halls and apartments appear on every hand, pillars and galleries are numerous; and some of the columns are as round, as smooth, and as snowy white as if chiselled from the choicest marble. From the top sparry icicles are seen suspended, and in some places they drop down like wax tapers of a radiant and transparent white. Similar in structure is the celebrated

ALABASTER CAVERN IN BIRMAH,

Which is the abode of numerous idols and altars consecrated to Buddha. This immense cave is in the heart of a huge limestone rock, and seems to have been formed by an earthquake. In size it is immense, and in natural attributes sufficiently gloomy and mysterious to suit the purpose of the Buddhist priest. Huge hollows occur in many parts of it, which are used as retreats for the most impressive solemnities; but it is the great domed portion which is chiefly used for the rites of religion. The roof is of rough limestone covered all over with the most beautiful stalactites; and what with the dim light and the grim expression of countenances of the wooden deities, the gloom and silence of the cavern, it is a scene not easily effaced from the memory. The cavern extends completely through the rock, so that the visitor can pass in at one end and out at the other.

THE PEAK IN DERBYSHIRE

is of similar structure, and is certainly the finest cavern in this country. The Peak is approached through a rude and savage pass, named Winyats (gates of the winds), flanked with precipices 1000 feet high. It is a limestone mountain, and perforated, as mountains of that kind of rock often are, with an immense cave. On the top are perched the remains of a castle, once the residence of a family descended from William Peveril, a natural son of the Conqueror. In the precipice below, above 600 feet from the top, is the entrance of the cave, a flattish Gothic arch, 120 feet wide and forty-six in height. Within this arch the cavern recedes about ninety feet. Here a company of twine-makers pursue their humble trade. At the extremity of the first cave, which alone enjoys any of the light of day, a low and narrow arch leads into a spacious opening, called "the Bell-house," whence a path leads to the "First Water." This is a lake forty-two feet in breadth, passing below a massive arch of rocks, in some places not more than twenty inches above the surface of the water. Laying himself flat along the bottom of a small canoe, the visitor with his guide shoots through below the depending rocks into an opening 220 feet in length, 200 in breadth, and 121 in height. At the further extremity of this spacious cavern, the stream which flows along the bottom forms itself into what is called "the Second Water," near the end of which is a pile of rocks subjected to a perpetual copious dripping from the roof, and called "Roger Rain's House." Other passages and expansions succeed, till the cave ceases to be passable at the distance of 2300 feet from the opening. On returning from his torch-lit adventure to the mouth of the cave, the visitor experiences a singular impression of novelty and delight from beholding again the surface of the daylight world.

A more extraordinary spot perhaps is in the immediate neighbourhood, at the foot of the Winyats, or windgates, consisting of a deep and narrow chasm of a mile in length, the lower descent of which commands a fine view of Castleton. Here is the Speedwell mine, a great artificial excavation, leading to a natural cavern. After descending upwards of a hundred steps, the visitor reaches a region of the blackest darkness, and embarks on a canal so narrow that he touches the rocks on each side of him as well as the ceiling above. Traversing this for half-a-mile, an immense vacuity in the mountain is reached, and landing upon a ledge of rock, the scene becomes indescribably strange and marvellous. On the one hand there is an abyss of unknown depth, appropriately called the "Bottomless Pit," into which the torches of the guide throws not the least flicker of illumination. This bottomless pit receives the water which flows from the higher levels of the cave, which makes a startling sound as it trickles into this fathomless abyss. In the excavation of the mine, as much as forty thousand tons of material were cast into this hollow, without affording any definite idea of its depth, or lessening in any way its apparent unfathomableness. On the other hand, an immense cavern opens, the ceiling of which is too high for any light to reach; for rockets have been fired at it, and have given out their brilliant coruscations, just as if let off under the black sky of midnight.

An interesting locality near the Peak is

BLUE JOHN CAVERN,

which is a natural cavity, from which large quantities of fluor spar are obtained, the specimens being found in small detached pieces in the limestone rock. Rude steps, leading downwards about one hundred and eighty feet, conduct to a series of caverns and passages encrusted with deposits of lime, which have assumed numerous interesting forms. The stalactites are of a pearly yellow colour, and intertwine into the most fantastic combinations. One large mass of stalactites has formed a sort of harmonious structure, consisting of a number of stems rising from a common base and attached above to a common ceiling, but, owing to the depredations of visitors—who, in this country, rather merit the title of iconoclasts—the beautiful structure has been much mutilated. The collection of stems so arranged, bear the name of "the Organ," and certainly shadow out some faint resemblance to a set of organ pipes. The chief department of this cavern is called "the Hall," which is a wide and lofty cavity, sufficiently massive and impregnable to form a home for the most desperate of freebooters. In this "hall," an English nobleman, some years ago, feasted a number of his friends, and made the wet rock resound with the toasts and triumphs of festivity. From the "hall" the visitor is led into a narrow funnel-shaped cavity with a domed roof, popularly termed "the Cupola," and when here a circle of lighted candles is hoisted by a pulley, and an exhibition of surpassing loveliness is immediately produced. From every knob and point of the stony icicles, and from the sharp points of ledges of the unhewn rock, the gleams of light flash in a thousand coruscations of every variety of brilliancy and colour. Diamond points, all life and glitter, sheeted gleams, all silvery and smooth; and clustering diadems of ruby, emerald, and gold, flash from every part and form a strange assemblage of reflections and re-reflections. To add to the enchantment, the noise of falling water,

"Like distant cataracts of silver falling,"

comes with bell-like tone upon the ear; and the miners, by preconcerted arrangement, suddenly commence full chorus in another part of the cave, the rich echoes of which, softened and subdued by the intricacies of the place, complete the fairy-like wonders of this palace of beauty.

More renowned in story, though not more worthy of note than the caverns of the Peak, is the celebrated

GROTTO OF ANTIPAROS,

which derives its chief features of interest from the number and variety of its stalactites.

Antiparos is a little island in the Grecian archipelago; it is about sixteen miles in circumference, and is separated from the classic Paros by a very narrow channel. The cavern extends about a thousand feet beneath the surface, in primitive limestone; and is reached by a narrow entrance very steeply inclined. "Having been informed," says Magni, "that a gigantic statue was to be seen in the island of Antiparos, it was resolved that we should pay it a visit. In pursuance of this resolution, after we had landed in the island, and walked about four miles through the midst of beautiful plains and sloping woodlands, we at length came to a little hill, on the side of which yawned a most horrid cavern, that with its gloom at first struck us with terror. Recovering the first surprise, we entered boldly; and had not proceeded above twenty paces when the supposed statue of a giant presented itself to our view. We quickly perceived that what the ignorant natives had been terrified at as a giant, was nothing more than a sparry concretion formed by the water dripping from the roof of the cave, and by degrees hardening into a figure that their fears had formed into a monster. As we proceeded, new wonders offered themselves, the spars, formed into trees and shrubs, presented a kind of petrified grove; some white, some green, and all receding in due perspective. They struck us with more amazement as we knew them to be mere productions of Nature, who, hitherto in solitude, had, in her playful moments, dressed the scene as if for her own amusement.

"In one corner of this half-illuminated recess, there appeared an opening of about three feet wide, which seemed to lead to a place totally dark, and that one of the natives assured us contained nothing but water. In order to be certain, we sent down a Levantine mariner who, with a flambeau in his hand, ventured into this narrow aperture. After a quarter of an hour, he returned, carrying some beautiful pieces of white spar in his hand, which art could neither imitate nor equal. Upon being informed that the place was filled with these beautiful incrustations, I ventured in with him for about fifty paces, anxiously and cautiously descending by a steep and narrow way; and descending one after another, we at last saw ourselves all together in the most magnificent part of the cavern.

"Our candles being all now lighted up, never could the eye be presented with a more glittering or a more magnificent scene. The roof all hung with solid icicles, transparent as glass, yet solid as marble. The eye could scarcely reach the lofty and noble ceiling; the sides were regularly formed with spars; and the whole presented the idea of a magnificent theatre, illuminated with an immense profusion of lights. The floor consisted of solid marble, and, in several places, magnificent columns, thrones, altars, and other objects appeared, as if Nature had designed the work to imitate the curiosities of art. Our voices, when speaking or singing, were redoubled to an astonishing loudness; and upon the firing of a gun, the noise and reverberations were almost deafening. In the midst of this grand amphitheatre rose a concretion of about fifteen feet high, that, in some measure, resembled an altar; from which, taking the hint, we caused mass to be celebrated there. The beautiful columns that shot up round the altar, appeared like candlesticks; and many other natural objects represented the customary ornaments of this sacrament."

THE GROTTO DEL CANE,

Merits notice rather from the fame it has acquired in books, than for any marvellous characteristics in its construction. It is in the neighbourhood of the Lake Aquano, near Puzzoli at Naples; and is a limestone cavity of small dimensions. It was known to the ancients, and is termed by Pliny one of "Charon's Ditches." The circumstance to which it owes an unworthy fame is, that of the production of large volumes of carbonic acid gas, which issue from the floor of the cave, and prove fatal to small animals which breathe it. From the practice of the guides taking dogs into the cave, in order that the visitor may observe the stupor of the animal when compelled to breathe the noxious vapour, it has received its name of "Dog-cave." Poisonous gases however, are by no means rare as productions of excavations and subterranean passages. Instances occur of a similar nature, and quite as striking in detail in the volcanic districts of Neyruc in the South of France, where the mephitic gas ascends from the soil and operates most prejudicially on the health of the people; as well also as in Pyrmont, and in Java, where the extraordinary valley of Guwo-upas is strewed with the ghastly skeletons of those who have perished in attempting to pass through it. This last instance connects itself with the wonderful story of the fabulous upas-tree, respecting which we shall treat in the proper place.

Several interesting cavities occur in the coal and iron fields of Great Britain on which we can only bestow a passing notice. One of these, situate in the heart of the South Staffordshire coal and iron mines, is known as the

CAVERN OF DUDLEY CASTLE,

Where the quarries extend into huge hollows under Dudley Castle Hill, and open upon the strange underground scenes. Here are numerous arched tunnels and narrow passages in the ancient mountain limestone; and between the natural and artificial galleries run numerous canals, the waters of which gleam strangely in the torch light, and contrast beautifully with the frowning forms of the huge rocks around them.

ODIN'S MINE

Also merits attention from a few Scandinavian traditions which are associated with it. It is situate at the southern foot of Main Tor, in Derbyshire, and has long been worked for its mineral treasures. To the visitor this mine presents numerous attractions peculiar to itself, not the least of which are the violent and frequent explosions which are effected for the prosecution of the mining operations. Passing from these minor phenomena, we come to another genuine cavern—deserving of higher popularity than it has yet attained. This is

PETER ALLAN'S CAVE, AT MARSDEN,

Near South Shields, a wonderful artificial excavation, scarcely known beyond the limits of the Newcastle coal field. This cave is on the seashore, a few miles distant from the mouth of the Tyne, and forms a summer resort for the inhabitants of the neighbouring towns, who make up small pic-nic parties to visit it. Marsden bay is a fine semicircular opening in a line of magnesian limestone rocks, which part the sea in bold escarpments and picturesque headlands. The rocks around are some of them of immense size, and several detached fragments stand alone in most curious forms and positions. As the visitor approaches from the sands, he is struck by the beautiful groups of boulders and black shining fragments which the surf tumbles about at its will, and amidst which it dances and roars like a creature of gnome-land mad with sport. One of these groups is covered all over with a velvety surface of sea-weed, of the most brilliant emerald green; and forms a sort of fairy garden in the midst of a desert of brown stones. These are called the "velvet beds." Further on is an isolated pillar of laminated limestone, called "Lot's Wife;" and immediately after passing this we come on the strange and picturesque scene of Peter Allan's Cave, which at first sight bears the aspect of a primitive farm in one of the recesses of the Alps. The cliffs are faced with numerous windows, some of them mere holes cut in the rock, others neatly framed with wood and glazed In front of the glazed windows a sort of shedding or farmstead is erected, projecting from the rock, and forming an outpost, leading to the excavations within; and around this outer wooden erection all the sights and sounds of a sea-side farm prevail. Here are porkers very fat, and barkers very pugnacious, goats that give milk, and goats that butt fiercely at strangers, while from several dovecots, flocks of pigeons sail forth to circle over the boiling surf hard by, or to forage on the green gorsy hills above. This strange half farm, half hermitage, is the grotto of Peter Allan, who left the civilized circle of a mining district to colonize this rugged cliff and plain of sand.

Previous to the location of Peter Allan at this spot, it had been the resort of numerous smugglers, who found it a safe retreat for their contraband enterprises; one of those known as "Jack the Blaster," had begun the work of excavation. An immense hole, called "Jack the Blaster's hole," forms a direct communication between the high land above, and the sea at high or the sand at low tide. These preliminary operations seemed to render the place inviting to Peter, who possessed a wild roving spirit, and longed to be engaged in some strange enterprize apart from the buzz of men. On this work Peter entered, and being skilful in mining, soon made rapid progress in the construction of a habitable cavern for himself and family. After arduous labour he succeeded in hewing fifteen rooms in the solid rock, and in fronting these with farm sheds, and a small wooden spirit store, which he dignified with the name of "Inn." Spite of his romancing spirit, Allan's object was business; and he soon succeeded, by the fame of his enterprize, in attracting crowds to see his cave; but, owing to a jealousy of the farmers who held the land above the cliffs, he got involved in a lawsuit as to his right of occupancy, and becoming entangled in difficulties, died of a broken heart.

The place is certainly a marvel of ingenuity and industry. It is full of relics of Peter Allan, each of which has attached to it a legend or anecdote. The most remarkable of the rooms are the "gaol room" and the "ball room." The first is a large excavation in the rock leading to a circular chamber on one side and a dining-room on the other. The "ball room" is very spacious, and is roofed and floored over a great portion; one end being left in its primitive condition, and communicating with other passages. On the rough walls some rude sculptures have been executed, and numerous devices and curiosities supply subjects for inquiry and conversation. The height of the entire excavation is about twenty feet; its breadth thirty feet; and its length from the end of the ball room to the cottage, one hundred and twenty feet. It is astonishing how such vast excavations could have been completed by the hands of one man.

To view this rock the strangers haste,
Its pillars rudely hewn;
Apartments fitted to each taste,
With rooms up stairs and down.
If you're inclined to join the ball,
There's music in great store,
And spice and fruit upon a stall,
By Peter Allan's door.

The wooden clock fast to the rock,
Each fleeting moment tells;
The laden bees return, a flock,
Unto their waxen cells.
The very pigeons have a cot,
Their number full a score;
They wash themselves in weather hot,
At Peter Allan's door.

Strange stories are told of the adventures of Peter, who has long since rendered his last account, leaving his widow and family in possession of the grotto. Anecdotes are told of his frightening away officious excisemen by the sound of his unerring gun, which carried fire and death with matchless certainty. It is also told that during a heavy fall of snow, some few winters back, the family were blocked in the cave for six weeks, during which time they were completely blocked in by a snow-drift, and saw not the face of a single individual.

Directly opposite the grotto is a large table rock, standing isolated from the cliffs, with the surf pelting its foundations. It is known as

MARSDEN ROCK,

and was colonized by Peter Allan, who has converted it from a barren wilderness to a small paradise of grass and rabbits. The ascent is gained by means of ladders, placed outside for a considerable distance, and then passing through twenty-five feet of the interior of the top. Peter and his two assistants completed, in a fortnight, the scaling and excavations, for facilitating the ascents. A tent was erected on the top, with a flag above it, and its sides covered with green boughs; and here the three pioneers lived during the whole time the work was in progress. The base of the rock is hollowed out into numerous archways, through which the distant shipping may be seen passing and repassing in a beautiful panorama; to the slow motion of which, the chafing of the surf against the giant mass, and the musical roar of the breakers on the beach all round, form a chorus, and an accompaniment.

We shall conclude with a notice of a very humble and unpretending grotto, under the Cotswold Hills, known as

THE GROTTO OF SEVEN SPRINGS,

A lovely, picturesque, secluded place, worthy of regard for its quietude as a green retreat, but especially interesting to us as the *source of the river Thames.* Two streams contend for the honour of the parentage of the Thames. Both rise from the Cotswold Hills, but sixteen miles apart from each other. The one is known as Thames-head, and the other as Seven Springs. The latter is adjudged by the best authorities as most fairly entitled to be considered the principal source of the Thames. That which issues from Seven Springs appears to be the main branch; and this is the view always taken of it in the locality, where it is looked upon as one of the principal " lions," and few go to any of the neighbouring villages, or to Cheltenham, without being carried to see it. From its situation and the greater quantity of water that constantly flows from it, Seven Springs seems fairly entitled to the name of the " very head" of Thames; and it is lovely, quiet, and everflowing, as we could wish the head of Thames to be. The springs, which lie in a secluded dell, are overhung with a luxuriant canopy of foliage. The water gushes clear as crystal out of the rock from several different openings, and after whirling round a few times, starts off swiftly down the narrow channel it has scooped out for itself. Its name, Cern, or Churn, as it is now commonly spelt, is said to be the British Chwyrn, which signifies, *rapid;* but Rudder derives it from Corin, *the top,* and supposes it to have been so named because it was the top or head of the Thames. The former seems the most probable, but either will suit, and both appear to be preserved in the places on its banks, and which have owed their names to it, viz., Cirencester, the Roman Corinium, and North and South Cerney. From Seven Springs the stream runs through a narrow valley past two or three farm-houses, and by the little village of Cowley, when it bends to the east, and crosses the Cirencester road near Colesborne, where it is joined by the Lyde, and works a mill. It then makes its way along a glen-like valley under Cliffering Wood; here its course is extremely beautiful, the hill sides are steep and close together, that on the left being thickly covered with luxuriant foliage which forms a noble hanging wood, while the stream itself runs swiftly over a stony bed, reminding us in its seclusion and in its character of the beautiful northern becks. Nor does it lose much of its beauty, though it loses much of its wildness, in its progress through the rich grounds of Rendcombe, the property of Sir John Guise. All along this part of its course the uplands, that rise abruptly from it, are clothed with an abundance of noble trees, and the stream is well stored with trout, which are carefully preserved.

The way thus far will repay the attention of a young geologist. The Churn rises from the upper lias formation, and runs for several miles along a very narrow strip of it, almost entirely confined to the course of the river. Such is the lesson taught, by nature, of the great ends which may flow from small beginnings. The Thames, which bears upon its broad bosom the wealth and enterprise of half the world; which is the medium of communication between the most potent of sovereigns, acting in behoof of the first empire of the world, and the most distant courts, cities, states, and markets. The Thames, which has seen so much of our history and youth as a people, which has watered from the foundation of the first log, but to its present completion and durability, the largest, most enlightened, and most prosperous city in the world, has its origin in a little spring which bubbles out of a humble grotto in a rock, and where the hand may almost stop its course. It is the lesson which nature teaches all—the good beginning once made, there is no knowing to what it may lead in the future.

FOUNTAINS.

In almost all the principal cities of the continent, as well as in those of Asia, fountains have been erected in great abundance. They are often objects of great utility, especially in those warm climates where the atmosphere requires additional moisture, and not unfrequently possess remarkable architectural excellence and ornamental beauty. London, taken all in all, perhaps the most magnificent city in the world, has not even a single fountain possessing average excellence,—those in Trafalgar-square are rather a disgrace than a credit to the city. They throw up a large quantity of water, derived by steam power from an artesian well in the neighbourhood, which also supplies the Queen's palace and the Houses of Parliament, but the water gushes forth in too solid a form to have a beautiful effect. Perhaps the crystal fountain placed in the centre of the Great Exhibition was the most superb design of the kind ever seen in England, not even excepting those of Chatsworth, the seat of the Duke of Devonshire, which, however, are by far more powerful.

In foreign countries the water supply of the fountains is used for domestic purposes, so that they have not only an ornamental effect but a domestic utility, which could not be dispensed with without great public inconvenience. On the score of utility, however, the water supply of London is said to be greatly superior, and even cheaper, than that of any other metropolitan city, excepting perhaps New York. The water supply of London is indeed in itself a wonder, both as to its quantity and the means by which it is conveyed into every street and house of the immense area which it covers.

In Paris, fountains form one of the chief ornaments of the city. According to Dulaure's history of the French capital there were, in 1825, no less than one hundred and twenty-seven public fountains. "Many of them are very handsome structures; indeed, so important have they been considered as architectural monuments, that a collection of elaborate engravings of them have been published."

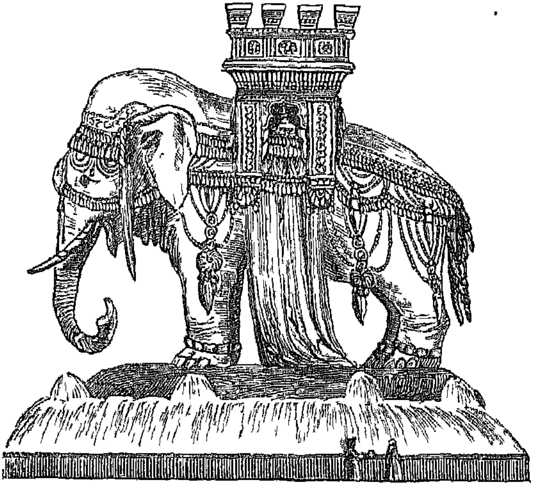
The illustration represents a design long since executed, though not erected, of the famous Fountain of the Elephant. This was one of Napoleon's thousand projects for embellishing the capital of France. This magnificent erection was to have been raised in the centre of the oblong rectangular space which now occupies the site of the Bastille, between the canal of St. Martin and the Arsenal. It was one of those finishing strokes of the Emperor's love of display which was intended to render this the most superb quarter of Paris. The model in plaster of Paris is now all that remains of this incomparable design, but even from that it is sufficiently obvious how fine the effect would have been.

"Upon the massive pedestal of stone was to have been placed a colossal elephant in bronze, surmounted by a tower, as seen in the illustration, the whole forming a figure of about eighty feet in height. A staircase leading up to the tower was to have been concealed in one of the legs of the figure, each of which was six feet and a half in thickness. The fountain was to have been adorned with twenty-four bas-reliefs in marble representing the arts and sciences. The foundation and model of this unexecuted conception remain as memorials of how sometimes

'Vaulting ambition doth o'erleap itself.'

The bronze for the enormous elephant was to have been obtained from cannons captured by the imperial armies in Spain,

—in that contest, then only in its first stage, the course and issue of which some time after contributed so materially to hurl from his throne the proud military chief, who thus so arrogantly anticipated conquest while on the eve of discomfiture and destruction." There are also several very extraordinary fountains at Versailles, the cost of which, with the palaces near which they stand, is said to have been ten millions sterling. The abundance of fountains in Rome, 'the City of Monuments,' and which has also been called 'the capital of the world,' are objects of universal admiration to the visitor. They pour forth an unceasing flow of water on every side, and so effectively do they minister to the gratification of the inhabitants, and especially of the casual visitor, that they are spoken of by Martyn as a refreshing luxury, "the full enjoyment of which cannot be felt but in such a climate as this; and those only who have known that delicious moment when the blaze of the summer day fades at last in the golden clouds of evening, can understand the voluptuous delight with which, in its



DESIGN FOR THE FOUNTAIN OF THE ELEPHANT AT PARIS.

hushed hour of stillness and repose, you listen to the music of their dashing murmur and rest beneath their freshness."

The fountains of Rome are variously and lavishly ornamented, though perhaps not always in the best taste, with fishes, sea-horses, lions, dragons, men, monsters, and gods. The Fontana Paolina is one of great attraction. "I love," says Martyn, "to repose my fancy upon the three noble cascades that are poured forth at the Fontana Paolina, the copious streams which burst from the rocks of the fountain of Trevi, and those silver fountains that throw high in air their glittering showers within the grand colonnade of St. Peter's." The fountains of Rome by Bernini, who has been called the modern Michael Angelo, because he united the knowledge and practice of painting, statuary, and architecture, are among the most celebrated. It may be mentioned as a wonderful feat, that, at the age of eight years, he executed a head in marble, which was considered for such a youth a most extraordinary performance. But it was to his skill in architecture that he was chiefly indebted for his reputation.

The fountain of the Prince of Palestine, situate in the Piazza Barberini, is one of his chief works, and the most admired of any of his designs. "It exhibits a Triton seated upon four Dolphins throwing up water from a large shell. Another of his fountains, called the Barcaccia or boat, is in the Piazza di Spagna. But the principal fountain of Berinini is that of the Strada Navona, the model of which won him the favour of Innocent X. It consists of a rock, having at each angle a colossal figure representing a principal river in each quarter of the world, viz. the Danube, the Nile, the Ganges, and the La Plata. From four caverns in the rock issue an equal number of cascades with a copious flow of water, and the summit is crowned by an Egyptian obelisk about fifty-five feet high, exclusive of the basement.

THE MANDRAKE.

Few of the pages in the history of imposture offer more materials for thought, than the absurd inventions of pretenders, in regard to the alleged qualities of the mandrake. So much absurdity has been uttered in regard to this curious plant, that many have come to regard its existence as entirely fabulous. This, however, is a mistake. The mandrake is a plant, whose root, at some distance from its upper part, separates into two portions, and has hence been likened to the human figure; the upper and undivided part representing the trunk, and the lower part in two halves representing the human legs. By some medical authors, it is classed amongst the narcotics, but the use of it as a narcotic, has been found extremely injurious. There are two species, the one is white, and called the male mandrake. the other black or dark purple, and is called the female mandrake.

Reuben, the son of Leah, went in the days of wheat harvest, and found mandrakes in the field, and brought them unto his mother Leah. According to Hebrew authors, the Dudaim of Scripture is the mandrake, but the mandrakes which Reuben brought home to his mother, are by some termed violets, and by others, lilies or jasmine, or citron. It is certain, that in ancient times, the mandrake was esteemed for certain wonderful properties attributed to it, and it was sometimes reckoned among the most valuable productions of nature. In China, it is reported, that in a certain spot in Pekin, a kind of mandrake grows, which is so valuable, that the root is worth its weight in silver; and they say that it restores the spirits of dying persons, and will even, in some cases, restore life, and enable them to get up from their beds immediately. Albert gives a detailed account of certain mandrakes, which, if wrapped in a linen cloth, bring "infinite happiness to the possessor." The same author links the existence of the mandrake with that of the familiar spirit which is supposed to attend every man; and attributes to the raw root the power of averting calamities. "These mandrakes," he says, "are procured from an egg hatched in a certain manner, which produces a little monster—half chick, half man." The author informs us, that some weak persons, who are fond of the marvellous, pretend that these mandrakes pay a tribute of a pistole every day; but this, he assures us, is not true, for all the power they possess, is to promote success in gaming, and in the discovery of treasures, and in prediction of future events. The ancient Germans made idols of mandrakes, and called the idols *alrunes*. They washed them with lime every day, gave them food, consulted them on all occasions, and believed they were answered by signs. They kept these idols in their houses, believing them to be a kind of household god.

What the ancients really meant in regard to this invention of gods, it is difficult now to conceive. They admitted so many inferior and superior gods, that the whole universe was full of them. Varro reckons that 30,000 were adored within a small extent of country; and the number of these was daily increasing. The way to heaven was so easy, that Juvenal brings in Atlas, complaining that he was ready to sink under the load of such a number of new gods, as were daily placed in the heavens; yet Father Mourgues seems to have proved that all the philosophers of antiquity have acknowledged that there was but one God.

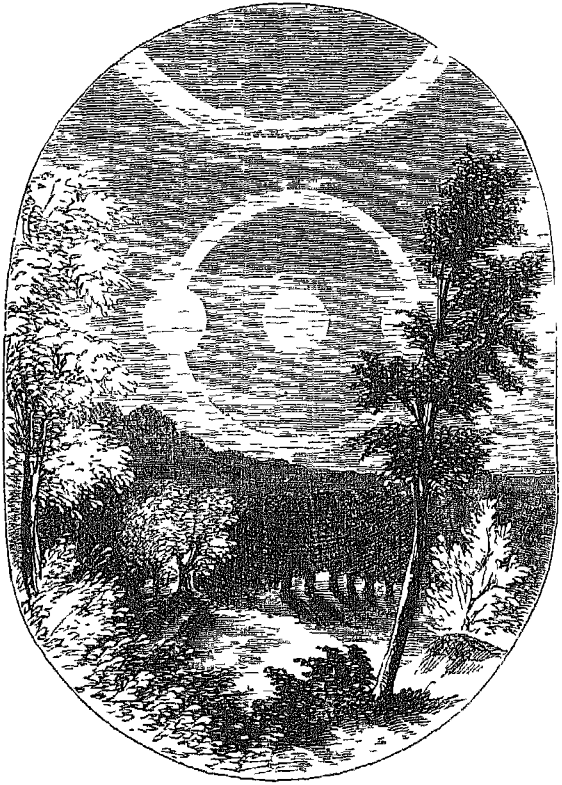
METEOROLOGICAL PHENOMENA.

> The day is lowering, stilly black
> Sleeps the grim wave, while heaven's rack
> Dispersed and wild 'twixt earth and sky
> Hangs like a shattered canopy!
> On earth 'twas yet all calm around,
> A pulseless silence; dread, profound;
> More awful than the tempest's sound.
>
> MOORE.

WINDS, storms, calms, and illusions, are among the chief atmospherical phenomena, respecting which the inhabitants of the British Islands have little practical knowledge. Temperate zones and small tracts of country are less subject to sudden changes of weather, or to violent exhibitions of storm and lightning, than the torrid climes, where large tracts of land or sea prevail. It is in the deserts of Africa that the atmospherical illusions of the mirage are most vivid and frequent; on the wide surface of the Pacific or Atlantic that the waterspout or the hurricane have their characteristic force and majesty. Some of these atmospherical revolutions are of the first importance to navigation, and many are the immediate cause of the fertility of regions where rain seldom falls. Almost first in importance, as agents of civilization, are the

TRADE WINDS,

which occur between the tropics, and blow regularly all the year from east to west. These were discovered by Columbus in the course of his patient researches on the western ocean. They are called "trade winds" in consequence of the facilities they afford for the commerce of the world by their uniform and unvarying course, enabling the merchant to calculate with certainty as to the transit of his merchandize, and the mariner to proceed with safety through regions far removed from land and home. The region in which the winds prevail is about four or five degrees wide, or about 350 miles; though it is liable to numerous fluctuations. On the



PARHELIA.

north side of the equator, the direction of the wind is from the north-east, and on the south of the equator from the south-east; a steady pressure towards the equator being caused by the intense heat of the sun above the line, which causes a rapid rarefaction of the air; the colder air rushing in to supply the place of that rarefied. In the Atlantic, the winds prevail right across the ocean, from the coast of Africa to that of America. In the Pacific, numerous shoals and islands prevent an uniform current in the atmosphere, and hence the trade-winds in that region are subject to many interruptions. Along the coast of Peru and Chili, where the general direction of the wind is south, a steady south-easterly wind is only experienced at the distance of five or six hundred miles from the shore. But these winds are not confined to the ocean, they prevail over many tracts of land near the equator, usually on extensive level plains, where nothing occurs to obstruct their passage or alter their direction. Along the flat lands of the Amazon and beside the course of the Orinoco, Humboldt noticed regular winds to set westward, which he believed to be identical with the trades.

The course of trade-winds is extremely simple, and easily understood. It is founded on the rarefaction of the air of the torrid zone, by the powerful heat of the sun, in connexion with the different velocities of the earth's surface; the equator moving much faster than the regions north and south of it. The sun, acting on a volume of air at the equator, causes it to rarefy and ascend rapidly, and the cooler air, from the north and south sides of the equator, rushes in to supply the place of that which has been rarefied, and becomes expanded in its turn. The earth, in the meantime, is travelling at the equator at the rate of about sixteen miles a minute, and the cool air which sets towards the equator, will encounter the velocity of the earth, which will strike it forward to the east, by the friction of its surface. But as the new volume of air, moving southward, does not acquire the velocity of the earth at first, a large portion will be left behind, and to all objects moving with the earth, these portions will act as westward currents, the equatorial tendency blending with the motion westward, and constituting, north of the equator a breeze from the north-east, and south of the equator a breeze over the east, a region of foggy calms separating them from each other.

THE MONSOONS

Are periodical winds which sweep the northern part of the Indian Ocean, changing their direction after an interval of six months; and are of extreme utility to navigation and agriculture. The region extending from three degrees south of the Equator, to the northern shores of the Indian Ocean, including the Arabian Sea, the Bay of Bengal, and the Chinese Sea, are visited by a south-west wind from April to October, and with a north-east wind from October till April The monsoons are much stronger than the trade-winds, and frequently assume the character of hurricanes. They are not confined to the ocean, but extend over the whole of Hindustan to the Himalaya, and bring copious rains each time they change their direction.

"On the 15th of October," says Mr. Caunter, "the flagstaff was struck [at Madras], as a signal for all vessels to leave the roads, lest they should be overtaken by the monsoon. As the house we occupied overlooked the beach, we could behold the setting in of the monsoon in all its grand and terrific sublimity. The wind, with a force which nothing could resist bent the tufted heads of the tall, slim, cocoa-nut trees almost to the earth, flinging the light sand into the air in eddying vortices, until the rain had either so increased its gravity, or beaten it into a mass, so as to prevent the wind from raising it The pale lightning streamed from the clouds in broad sheets of flame, which appeared to encircle the heavens as if every element had been converted into fire, and the world was on the eve of a general conflagration, whilst the peal, which instantly followed, was like the explosion of a gunpowder magazine. The heavens seemed to be one vast reservoir of flame, which was propelled from its voluminous bed by some invisible but omnipotent agency, and threatened to fling its fiery ruin upon everything around. In some parts, however, of the pitchy vapour by which the skies were by this time completely overspread, the lightning was seen only occasionally to glimmer in faint streaks of light, as if struggling, but unable, to escape from its prison; igniting, but too weak to burst the impervious bosoms of those magazines in which it was at once engendered and pent up. So heavy and continuous was the rain, that scarcely anything, save those vivid bursts of light which nothing could arrest or resist, was perceptible through it. The thunder was so painfully loud, that it frequently caused the air to kindle; it seemed as if mines were momentarily springing in the heavens, and I could almost fancy that one of the sublimest fictions of heathen fable was realised at this moment before me, and that I was hearing an assault of the Titans. The surf was raised by the wind, and scattered in thin billows of foam over the esplanade, which was completely powdered with the white feathery spray. It extended several hundred yards from the beach; fish, upwards of three inches long, were found upon the flat roofs of houses in the town during the prevalence of the monsoon, either blown from the sea by the violence of the gales, or taken up in waterspouts, which are very prevalent in this tempestuous season. When these burst, whatever they contain is frequently borne by the sweeping blast to a considerable distance overland, and deposited in the *most uncongenial situations; so that now, during the violence* of these tropical storms, fish are found alive on the tops of houses; nor is this any longer a matter of surprise to the established resident in India, who sees every year a repetition of this singular phenomenon."

Several other periodical winds are similar to the monsoons and are known under different names in the respective countries visited by them.

THE SIROCCO

Is well known as a hot parching wind which prevails in the Mediterranean, but is felt most violently about Naples and at Palermo. Its usual season is July, when it sometimes blows with great violence. The first blast is like the steam from a hot oven, the air ceases to refresh and a sense of suffocation takes possession of man and beast. The thermometer rises from 73° to 80°, then to 110° and 112°, while the air remains thick and foggy and the burning blast holds on. All Nature languishes while this wind lasts; vegetation droops and withers, Italians suffering as much as strangers. The strongest phrase of disapprobation which an Italian can use in regard to any wretched literary work, is to say, *era scritto in temps del sirocco*, "it was written during the prevalence of the sirocco." Somewhat similar in its effects is

THE SIMOON,

Which owes its origin to the same causes as the Sirocco, namely, the production of heated and noxious winds by the action of the sun on the sands of the Arabian deserts. The Simoon is common in Syria, Nubia, and Arabia, and in its mildest form is most deadly; many a pilgrim on his way to Mecca, and many a merchant travelling to Bagdad, fall under its fatal influence. Bruce suffered from it when ascending the Nile; where he says, "It blew as if it came from an oven; our eyes were dim, our lips cracked, our knees tottering, our throats perfectly dry; and no relief was to be found from drinking an immoderate quantity of water." "When these winds begin to blow," says Volney, "the atmosphere assumes an alarming aspect. The sky, at other times so clear in this climate, becomes dark and heavy; the sun loses his splendour and appears of a violet colour. The air is not cloudy, but grey and thick; and is in fact filled with an extremely subtle dust, which penetrates everywhere. This wind, always light and rapid, is not at first remarkably hot, but it increases in heat in proportion as it continues. The lungs, which in too rarefied air no longer expand, are contracted and painful. Respiration is short and difficult, the skin parched and dry, and the body consumed by an intense heat. In vain is recourse had to large draughts of water; nothing can restore perspiration. In vain is coolness sought for; all bodies in which it is usual to find it, deceive the hand that touches them. Marble, iron, water, notwithstanding the sun no longer appears, are hot. The streets are deserted, and the dead silence of night reigns everywhere. The inhabitants of towns and villages shut themselves up in their houses—and those of the desert in their tents, or in pits dug in the earth—where they wait the termination of this destructive heat. It usually lasts three days, but if it exceeds that time it becomes insupportable. Woe to the traveller whom this wind surprises remote from shelter! he must suffer all its dreadful consequences, which sometimes are mortal. The death is a real suffocation; the lungs being empty are convulsed, the circulation disordered, and the whole mass of blood driven by the heat towards the head and breast; whence the hemorrhage at the nose and mouth happens after death. The corpse remains a long time warm, swells, turns blue, and is easily separated; all of which are signs of that putrid fermentation which takes place when the humours become stagnant." It is believed that the destruction of the army of Senacherib was caused by a Simoon, when

The angel of Death spread his wings on the blast,
And breathed in the face of the foe as he passed;
And the eyes of the sleepers wax'd deadly and chill,
And their hearts but once heaved, and for ever grew still.

THE GREAT HURRICANE IN BARBADOS,

was a visitation such as the region of the tropics is frequently subject to, though, on this occasion, it was unprecedented in violence, and unusually disastrous. The storm commenced on the evening of the 10th of August, 1831, and lasted till the evening of the next day. The sun set with a red glow, and the atmosphere became oppressive; the dogs howled in a restless manner, and few persons were able to sleep. About twelve, the wind had risen to a strong gale, and the copper roofings of several houses were peeled off and flapped about. By three in the morning, the hurricane had attained its full force. An eye-witness of the effects of this hurricane thus records his experiences of the visitant—"Passing by one of the windows, of which the shutters were closed, I observed how strongly the wind blew through them; I was not at all aware that the glass was smashed to atoms, for the wind was so tremendous, that it completely drowned all other sound. I placed my hand against the shutter, to feel the current of the air, and while I yet held it there, the gale drove the whole shutter, window-frame and all, completely into the room.

"By this time the drawing-room was so exposed by the breaking in of the windows, that the furniture was driven from one end to the other, as though they had had wheels, and had received a furious push; chairs and heavy tables sliding violently about. We quitted the drawing-room, and all made for the chamber which was over it. In this place was now assembled the whole family, consisting of Mr. Braithwaite, his two sisters, myself, and a number of servants and slaves, amounting altogether to about twenty persons. The windows were broken in, and the rain poured into the room in torrents.

"The floor of the room above us now gave way, and broke the ceiling of that in which we were, so that we could see the sky; the window-frames were gone; and I long tried, but it was in vain, to keep a light burning under a glass shade. We were involved in pitchy darkness, except for the almost incessant lightning, which was frightfully vivid, and *made the succeeding gloom more awful; the flashes were so* close, that the thunder must have been tremendous; but in consequence of the overwhelming noise of the wind, we could not hear a single clap. The floor was now a foot deep of water, the wind blew completely through the room, and, except the lightning, all was completely dark. The time was inconceivably horrible; men, women, and children, screaming and groaning in utter despair, or crying piteously for mercy, endeavouring, in that awful hour, to make up a short account with heaven—imploring for pardon and pity with the most fearful supplications.

"At length the day broke. I need not attempt to describe what a blessed relief it was. I am confident that during that night there was not one person in the isle of Barbadoes, who in the least expected to see daylight again. We went down into the garden, but the wind was still so tremendous, that we were obliged to creep down on all fours, it being impossible to keep our feet. Scarceless a tree was left standing, or those which remained were mere sticks, the boughs completely stripped off; it was wonderful to see huge mountain cabbage-trees, more than eighty feet long, lying everywhere prostrate. The scene of desolation was most horrible; it was as if fire had gone all over the country, which presented a brown and scathed appearance, where only the evening before had been the most beautiful fertility; the wooden buildings were everywhere levelled. In Codrington College, a stone edifice consisting of a centre and wings, the top story of each of the latter (containing together sixteen rooms) was carried smoothly away. The ground was everywhere stuck closely over with large splinters of wood, carried by the wind, and driven in so far that a man could not extricate them, and even into trees of hard wood. A poor woman had one of these splinters driven by the wind through both her legs; amputation was necessary, and she died while they were cutting off the second leg. In the fields round the college I observed whole heaps of dead birds piled together at *regular* intervals, as if they had been laid there mechanically.

"The effect of the storm upon animals was singular. Every horse, cow, or other domestic animal we met, appeared in a state of utter stupefaction. Their eyes, ears, and nostrils, were filled with blown marl, dust, and sand, and they seemed to have been completely deafened by the tempest; where they were not in this torpor, madness had been the consequence. Horses, when let out of their stalls, rushed furiously about, and numbers threw themselves over precipices into the sea, or down declivities, where they were dashed to pieces.

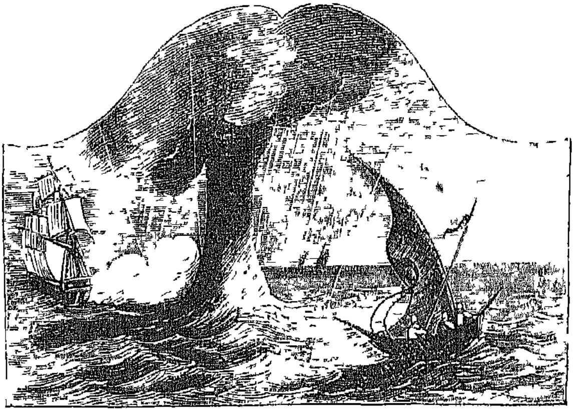
"The manner in which the houses in the town were rent, was exceedingly curious, and seems to countenance the idea that an earthpuake accompanied the storm. Among the strange objectso bservable in the street, was a large block of mahogany, which the wind had carried from the quay some way up the street; I say, *the wind*, for though the sea rose considerably, it never advanced far enough, or in nearly sufficient depth to float the block to where I saw it. In like manner, the wind had blown the ships completely out of the water, and laid them high and dry; the sailors made no attempt at resistance, but remained quietly on the beach, in a very snug shelter. It is said that the sea was very much agitated before the wind came, but I was not near enough to the ocean to confirm or deny the assertion. An army ship being near the island, stood off and on during the night, and in the morning ran into the bay; she perceived immediately what was our state, and instantly made for the other islands, to give notice that Barbados was in ruins. In about eight days, supplies began to arrive from the other islands. Our fears of famine were ill-founded, for the corn, though damaged, was almost ripe, and was thrown in heaps, and still quite available. One hundred thousand pounds was granted by England for our relief, £75,000 of which was allotted to Barbados, the rest to St. Lucia and St. Vincent's, which, however, suffered nothing in comparison. A very large subscription was also raised in England, and, happily, the crops had been shipped off before the hurricane occurred. The deaths were about 1700 in a population of 100,000.

One of the immediate consequences of tropical storms are

WATER SPOUTS AND WHIRLWINDS.

These are various aspects of similar phenomena; the first being the result of a whirlwind on the sea. It is the opinion of Colonel Capper that the storms of the Indian Ocean are always whirlwinds of varying diameter, having a progressive and rotary motion. Thenature of the whirlwind is frequently exemplified on a minute and harmless scale in this country, in the sudden gusts which come in March and November. Frequently, when these pass over a tract of ground where dead leaves are scattered, the rotary motion may be seen very plainly in the whirling dance which the leaves keep up, frequently writhing themselves into upright spirals, like dancing snakes. Mr. Redfield has found that the storms in the Atlantic usually occur in the form of a ring, round which the air revolves with amazing velocity, the area of the ring frequently extending to several hundred miles. It is worthy of note, also, that the hurricanes in the Southern hemisphere revolve in a contrary direction to those in the Northern. Mr. Williams, the missionary, describes a hurricane at Raratonga, during which the rain descended in deluging torrents, the lightning darted in fiery streams among the dense black clouds, the thunder rolled like parks of artillery, and the island trembled to its centre with the violent revolution of the elements. Scarce a banana tree was left either on the plains or the mountains, hundreds of thousands of which, on the preceding day, covered and adorned the land with their foliage and fruit; and immense chesnuts, which had withstood the storms of ages, were laid prostrate on the ground, while those which were not uprooted were left leafless and branchless skeletons.

When these whirlwinds sweep over the desert, they raise huge columns of sand, which sweep along with prodigious



violence, and overwhelm with ruin everything which lies in their march. Many a caravan is converted by one of these pillars of sand from a merry community of pilgrims to a ghastly heap of bare bones; horses, camels, and men being blinded and suffocated together. "One of the largest of these pillars," writes Caillie, describing a journey through the desert, "crossed our camp, overset all the seats, and whirling us about like straws, threw us one on the other in the utmost confusion. We knew not where we were, and could not distinguish anything at the distance of a foot. The sand wrapped us in darkness like a fog, and the sky and the earth seemed confounded and blended in one. Whilst this frightful tempest lasted, we remained stretched on the ground motionless, dying of thirst, burned by the heat of the sand, and buffeted by the wind." Sandstorms of the same kind as those of the African desert, occur frequently in New South Wales, in company with a hot wind, which converts the standing corn to charcoal, and leaves the earth as black as if scorched by fire. The columns of dust pass along with great rapidity, and with a silent steadiness of march, which renders them mysteriously awful. When they pass over water, a strange commotion takes place over the surface; but, on regaining the land, the gliding motion is again resumed. As some vanish, others rise to join in the waltz, and when the performance ends, the dusty performers appear to sit down among the neighbouring hills."

THE MIRAGE IN THE DESERT

Certain conditions of the atmosphere give rise to a class of phenomena which may well be considered apart from those already treated, because less frequent and less terrible. Indeed, the class of objects which we are now about to consider, are phenomena of extreme beauty, linked with the lispings of fable, and the songs of the bards; appealing less to the mind than to the senses, and awakening the imagination to new flights by their novel and delicate appearances. Yet there are exceptions, not to the general beauty of these appearances, but to the associations connected with them: one example of which is

THE MIRAGE,

which in truth is one of the most poetical illusions that human eye can witness; though associated in our minds with all that is malignant and deadly, because its appearances are made under such peculiar circumstances. The mirage was well known to the ancients, and has been described by several classic authors. It is a spectral illusion produced by unequal refraction, the various strata of air by which the light is reflected and re-reflected, being different in temperature and moisture, give rise to a blending of the rays of light by which the strangest pictures are produced. Humboldt frequently saw the mirage in South America. When residing at Cumana, he frequently saw the islands of Picuita and Boracha suspended in the air, and sometimes with an inverted image. On one occasion he observed small fishing-boats swimming in the air, above the well-defined horizon of the sea, and when they were viewed through a telescope, one of the boats had an inverted image accompanying it in its movements. This distinguished traveller observed similar phenomena in the barren steppes of the Caraccas, and on the borders of the Orinoco, where the river is surrounded by sandy plains. Little hills and chains of hills appeared suspended in the air, when seen from the steppes, at three or four leagues distance. Palm trees standing single in the Llanos, appeared to be cut off at bottom, as if a stratum of air separated them from the ground; and, as in the African desert plains destitute of vegetation appeared to be rivers or lakes.

But it is in the great African desert that the mirage is seen in its full character, and there it is a delusion as well as an illusion, and lures the weary traveller on and on with its promise of green grass and water, till he sinks exhausted on the sand, and perishes for the want of the refreshment which seems to hover on the horizon. The burning sand reflects the intense light of the sun, and the air being in rapid motion, and charged with clouds of dust, becomes a sort of magic canvass, on which refracted light paints these torturing pictures of green islands and glassy lakes which, as fast as the traveller endeavours to approach them, recede continually from his grasp. M. Monge, one of the philosophers who accompanied Bonaparte in his expedition to Egypt, witnessed a fine example of the mirage. In the desert between Alexandria and Cairo, in all directions green islands appeared surrounded by extensive lakes of the purest water. In the tranquil surface of the lakes the trees and houses with which the island was covered, were strongly reflected in vivid and varied hues, and the party hastened forward to enjoy the refreshments apparently proffered them. But when they arrived, the lake on whose bosom they floated, the trees among whose foliage they arose, and the people who stood on the shore inviting their approach, had all vanished; and nothing remained but the uniform and irksome desert of sand and sky, with a few naked huts and ragged Arabs. M. Monge attributed the liquid expanse tantalising the eye with an unfaithful representation of what was earnestly desired, to an inverted image of the cerulean sky intermixed with the ground scenery.

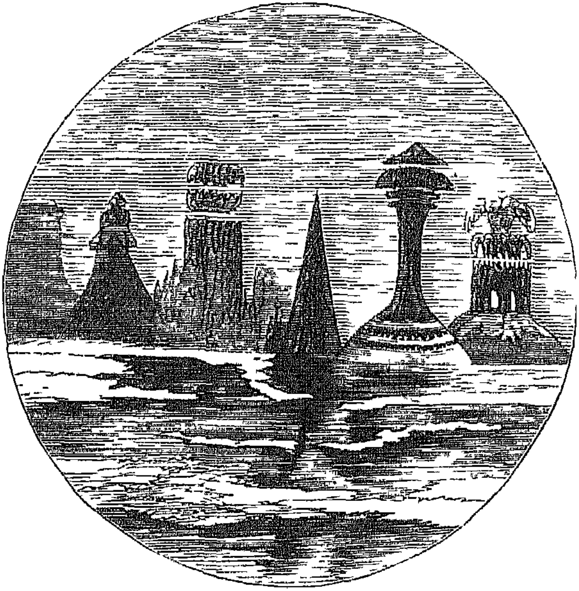
Inverted images of ships are frequently seen by navigators in the Arctic regions, where the immense fields of bright blue ice and the masses of glaring white snow afford admirable apparatus for these magic pictures. In these cases, however, there is no deception; the *image* of a ship seen *above* the horizon, is the reflection of a *real* ship sailing *below* the horizon. On the 20th of June, 1820, Captain Scoresby, when navigating the icy sea, west of Greenland, observed about eighteen sail of ships at the distance of ten or fifteen miles. The sun was shining powerfully, and the snow and ice were melting in all directions, and forming large pools of the clearest water, from which numerous rivulets ran away to the open sea. About six in the evening, a light breeze sprung up and the spectre ships began to change their form, and exhibited most extraordinary appearances. One ship had a perfect image, as dark and distinct as the original, united to its mast head in a reverse position. Two others presented two distinct inverted images in the air, one of them a perfect figure of the original, wanting the hull. Two or three more were strangely distorted, their masts appearing of at least twice their proper height, the top-gallant mast forming one half of the total elevation; and other vessels exhibited an appearance totally different from all the preceding, being as it were compressed in place of elongated.

But the most remarkable image of this kind presented to Captain Scoresby, was that which occurred in 1822, when, having seen an inverted image of a ship in the air, he directed to it his telescope, and was able to discover it to be his father's ship, which was at the time below the horizon. "It was," he says, "so well defined, that I could, by a telescope, see every sail, the general rig of the ship, and its particular character, insomuch, that I confidently pronounced it to be my father's ship, the "*Fame*," which it afterwards proved to be; though, on comparing notes with my father, I found that our relative position, at the time, gave a distance from one another of about thirty miles, being about seventeen miles beyond the horizon, and some leagues beyond the limit of direct vision.

But by far the most remarkable of this class of optical atmospherical phenomena is that of

THE ENCHANTED COAST,

Which was observed by Captain Scoresby on the coast of Greenland, in the year 1820, during a thick fog. Having approached near the unexplored coast of Greenland, the Captain determined to make a drawing of its aspect, but found *the outline changing every instant.* The *general telescopic* appearance of the coast was that of an extensive ancient city abounding with the ruins of castles, obelisks, churches, and monuments, with other large and conspicuous buildings. Some of the hills seemed to be surmounted by turrets, battlements, spires, and pinnacles; while others, subjected to one or two reflections, exhibited large masses of rock, apparently suspended in the air, at a considerable elevation above the actual termination of the mountains to which they referred. The whole exhibition was a grand phantasmagoria. In this country similar spectral appearances are frequently seen. In the year 1743, Daniel Stricket, servant to John Wren, of Wilton Hall, Souterfell, Cumberland, was sitting at the door along with his master, when they both saw the figure of a man with a dog pursuing some horses along the Souterfell side, a place so extremely steep that a horse could scarcely travel on it at all. The figures appeared to run at an amazing pace, till they got out of sight at the lower end of the fell. On the following morning, Stricket and his master ascended



ENCHANTED COAST.

the steep side of the mountain, in the full expectation of finding the man dead, and of picking up some of the shoes of the horse, which they thought must have been cast while galloping at such a furious rate. But no traces of either man or horse could be found, and the turf was not marked with a single impression of a horse's hoof On the coast of Sussex it is common for the French coast to become visible, though the cliffs are fifty miles distant from each other, and a straight line drawn from Hastings to the French coast would, owing to the convexity of the earth, pass through the sea.

A phenomenon, no less marvellous, was seen by Professor Vince, of Cambridge, and another gentleman; on the 6th of August, 1806, at Ramsgate. The summits of the four turrets of Dover Castle are usually seen over the hill, upon which it stands, lying between Ramsgate and Dover; but on the day above-mentioned, at seven o'clock in the evening, when the air was very still and a little hazy, not only were the tops of the four towers of Dover Castle seen over the adjacent hill, but the whole of the Castle appeared as if it were situated on the side of the hill next Ramsgate, and rising above the hill as much as usual. This phenomenon was so very singular and unexpected, that at first sight Dr. Vince thought it an illusion; but, upon continuing his observations, he became satisfied that it was a real image of the Castle. Upon this he gave a telescope to a person present, who, upon attentive examination, saw also a very clearimage of the Castle, as the doctor had described it.

A very beautiful and most remarkable occasion of Mirage, which took place at Ramsgate recently. An occurrence of this sort, to such an extent as the present, had not been witnessed for many years. The appearance of the atmosphere over the sea during the whole day was very peculiar; and the refraction operating upon the ships anchored in the Downs, increased their hulls to three times their respective bulks. Vessels in the offing were seen as it were suspended in the air; others with an *inverted* reflection; and in one instance, to the west of the southermost head of the Goodwin Sands, a ship was doubly reflected.

The coast of France presented a most extraordinary appearance. The white cliffs were elevated several degrees above the horizon, and inversely refracted, while the apparent nearness was most striking. After nightfall, the lighthouses on the coast at Calais, Grinez, Gravelines, and Dunkirk, were *distinctly seen. That some peculiar atmospheric action was* going on is proved by the thunderstorms in different parts, but which did not reach these districts.

Decidedly the most magical form of the Mirage, is that known as the

FATA MORGANA,

which haunts the coasts of Messina, between Sicily and Calabria, and is pronounced, by those who have seen it, the most enchanting phenomenon it is possible to conceive. The spectacle consists of images of men, cattle, houses, rocks, and trees, pictured upon the surface of the water, and in the air immediately over the water, as if called into existence by an enchanter's wand, the same object having frequently two images, one in the natural and another in the inverted position. When the sun has risen over the Calabrian heights, so as to make an angle of 45° with the horizon, the various objects on the shore at Reggio, opposite to Messina, are transferred to the middle of the strait, forming an immovable landscape of houses, rocks, and trees, and a movable one of men, houses, and cattle upon the surface of the water. If the atmosphere at the same time is charged with vapour, another picture will be formed in the air, about twenty feet above the phantom on the surface of the strait. The term by which this is known has reference to the popular belief in the Morgana, as being the result of fairy influence, numerous legends existing among the people of Messina, who deemed the Morgana the the omen of good.

Father Angellicci describes the scene in the following terms—"As I stood at my window, I was surprised with a most wonderful delectable vision. The sea that washes the Sicilian shore swelled up, for the distance of ten miles, like a chain of dark mountains; while the waters near the Calabrian shore grew quite smooth, and in an instant appeared as one clear polished mirror, reclining against the aforesaid ridge. On this glass was depicted, in *chiaro scuro*, a string of several thousands of pilasters, all equal in altitude, distance, and degree of light and shade. In a moment they lost half their height, and bent into arcades, like Roman aqueducts. A long cornice was next formed on the top, and above it rose castles innumerable, all perfectly alike. These soon split into towers, which were shortly after lost in colonnades, and at last ended in pinea, cypresses, and other trees, even and similar. This was the Fata Morgana, which for twenty-six years I had thought a mere fable."

Where the sun lies
On Reggio's shore, go mark its ruins fling
Their shadows on the stream, till slowly spring
Embattled towers emerging from the deep,
Pillars and castled walls: gates opening
Or serried armies, marshalled horse that leap
Into the flying plains, and charging squadrons sweep.

And cliffs cloud-capped, deep vales, white herds far seen,
And shepherds with their flocks, and mountains bare,
Looking repose: lo! in the silvery sheen
Floating above the wave they melt to air,
Reflection but of ruins! woven there
From mist and shadow: but they finger forth
Truth, tongueless Nature, doth herself declare
To thee, fall'n Italy! regenerate birth
This shall be thine from death, freedom and pristine worth.

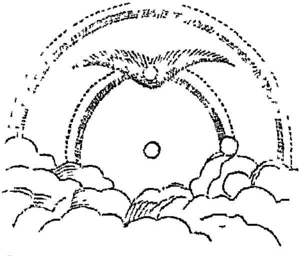
READE.

HALOS AND PARHELIA

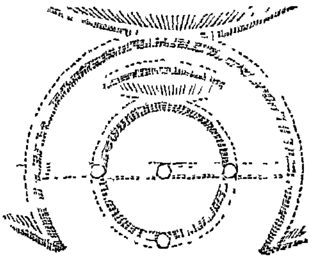
Are produced under circumstances much the same as those which cause the mirage; namely, atmospherical refraction

Frequently the sun becomes double, and sometimes is seen surrounded with several mock suns, the moon being at times subject to the same illusive combinations. In Iceland, during the severe winter of 1615, it is related that the sun, when seen was always accompanied by two, four, five, and even nine separate mock suns. In the Philosophical Transactions for 1733 occurs a description of a parhelia, which appeared on the morning of Oct. 22nd, 1721, at Lyndon, in Rutland. "Two plain parhelia or mock suns appeared tolerably bright and distinct, and that in the usual places, namely, in the two intersections of a strong and large portion of a halo. The mock suns were evidently red towards the sun, but pale or whitish at the opposite sides, as was the halo also. Looking upward we saw an arc of a curiously inverted rainbow. This arc was as dintinct in its colours as the common rainbow, and of the same breadth." A very remarkable halo was seen by Sir Henry Englefield, at Richmond, in 1802, and described in the Journal of the Royal Institution.

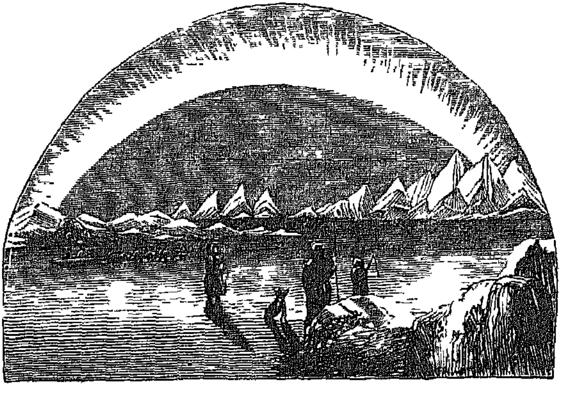
The sun being about fourteen degrees above the horizon, portions of two halos were seen, one at twenty-four degrees, and the other at forty-eight degrees from him; the interior portion was of a pale yellow, and a degree broad; and the other, which was about one degree and a half broad, was tinted with prismatic colours, the red being nearest to the sun. On the left-hand side of the interior ring, and in a line imagined to be parallel to the horizon, was a faint parhelion; and vertically above the sun, in the same ring, was a very remarkable parhelion, rather brighter than the true sun; it had a pearly appearance, was ill defined, and about two degrees broad. From each side of this image proceeded a bright curve of contrary flexure, being first convex, and then concave towards the sun. It extended nearly to the outer circle, and its lower side was tolerably defined; but the upper side melted, with streaks of light, into the sky: the parhelion with its curved prolongations is said to have had the appearance of a vast bird hovering over the sun. During his arctic voyages several halos were observed by Captain Parry. In one which was double, a horizontal circle of light, at the



intersections of which with the interior halo were parhelia passed through the true sun; and there were segments of circles both at the upper extremities of the two halos and at the lower extremities of the interior one, the latter being incomplete. The altitude of the true sun was about twenty-three degrees; and the radii of the two circles were, respectively, twenty-two and a half-degrees and forty-five degrees. The lowest parhelion was very bright, but had no colours, while all the segments were strongly tinted with colour. Above the sun, at about twenty-six degrees from him, and between the two halos, was a small portion of a third halo, which appeared to be elliptical; and the space between the two segments was extremely brilliant, in consequence of strong reflections of the sun's rays from the snow which floated in the atmosphere.



THE AURORA BOREALIS



is the most beautiful, perhaps, of all these atmospherical pictures. To the imaginative mind it is a phenomenon full of poetical suggestions ; and as a mere display of brilliant light and colour, one of the most sublime that can be witnessed. It is in the "spacious regions of the north,"

> "Where for relentless months, continual night,
> Holds o'er the glittering waste her starry reign,"

that the Aurora Borealis or "northern daybreak," is seen. When the light of the sun has departed, and Winter, with horrid grasp, clutches the fresh stream and the green moss, and seals up the world in snow-bands and chains of adamant ; when icy desolation reigns below, and night and silence hold companionship above,—then it is that the sky pours down cataracts of rosy flame and a new effulgence, born of the very chill and darkness, lights the hunter in his wanderings, and cheers the husbandman at his sea-drift fire.

> By dancing meteors then, that ceaseless shake
> A waving blaze refracted o'er the heavens,
> And vivid moons, and stars that keener play
> With doubled lustre from the glossy waste ;
> E'en in the depth of polar night they find
> A wondrous day : enough to light the chase,
> Or guide their daring steps to Findland fairs.

The appearance exhibited by the Aurora are so various as to render it impossible to comprehend every particular in a description that must be necessarily brief and general. A cloud, or haze, is commonly seen in the northern region of the heaven, *but often bearing towards the east or west, assuming* the form of an arc, seldom attaining a greater altitude than 40°, but varying in extent from 5° to 100°. The upper edge of the cloud is luminous, sometimes brilliant and irregular. The lower part is frequently dark and thick, with the clear sky appearing between it and the horizon. Streams of light shoot up in columnar forms from the upper part of the clouds, now extending but a few degrees, then as far as the zenith, and even beyond it. Instances occur in which the whole hemisphere is covered with these coruscations ; but the brilliancy is the greatest, and the light the strongest in the north, near the main body of the meteor. The streamers have in general a tremulous motion, and when close together present the appearance of waves, or streaks of light, following each other in rapid succession. But no rule obtains with reference to these streaks, which have acquired the name of "the merry dancers," from their volatility becoming more quick in their motions in stormy weather, as if sympathising with the wildness of the blast. Such is the extraordinary aspect they present, that it is not surprising the rude Indians should gaze upon them as the spirits of their fathers, roaming through the land of souls. They are variously white, pale red, or of a deep blood colour, and sometimes the appearance of the whole rainbow, as no hue is presented. When several streamers emerging from different points of the heavens unite as the zenith, a small and dense meteor is formed, which seems to burn with greater violence than the separate parts, and glows with a green, blue, or purple light. The display is over sometimes in a few minutes, or continues for hours, or through the whole night, and appears for several nights in succession.

The auroral arc is known to be the result of certain magnetical operations in the higher regions of the atmosphere around the pole.

THE LUNAR RAINBOW

is caused by the action of the moon's rays on a descending shower, just as the ordinary rainbow is the result of a similar action of the rays of the sun. Lunar rainbows occur but seldom; when they do, they excite much interest, owing to their variety and delicate beauty. Much curiosity was excited by a lunar rainbow which appeared near Northwich, in Cheshire, on the night of December 3rd, 1845, and which was seen by but few persons. The afternoon had been very stormy, with thunder and lightning and heavy rains; but, as the evening approached, the rain became less frequent, and the moon broke through a bank of clouds, in the midst of a blue patch of starlight. The rainbow was formed immediately, in direct opposition to the moon; its colours were faint but distinct, and it spread across the sombre sky like an angelic renewal of the covenant, its face full of starlight serenity, purity and peace. As the arch increased in breadth and brilliancy of colour, its beauty was much enhanced by numerous groups of stars which dotted the interior of the semi-circle, and surrounded the outer zone like splashes of light emanating from the rainbow's edge. The clouds and stars were scarcely obscured by the fleecy outline of the rainbow, and Jupiter could be seen plainly through the upper segment of the arch. Orion burnt below, full of light and glory, and in the course of half an hour the aerial wonder broke into two arches and then vanished, leaving the night to the company of clouds and glooms and vapours. Of a lunar rainbow, which appeared on the 27th of September, 1828, Miss Strickland wrote the following—

Vision of beauty! there floats not a cloud
O'er the blue vault of Heaven, thy glory to shroud;
The star-gemmed horizon thou spannest sublime,
Like a path to a better and lovelier clime.

Thy light unreflected by planet or star,
Still widens and brightens round night's spangled car,
In radiance resembling the moon's placid beam,
When she smiles thro' the soft mist that floats on the stream.

Thou sittest enthroned like the Spirit of Night,
And the stars through thy zone shed a tremulous light.
The moon is still sleeping beneath the wide sea,
While wonder is keeping her vigils with thee.

The bow of the Covenant smiles on the storm,
When its dark wings are shading the brow of the morn,
But thou art uncradled by vapour or cloud,
Thy glory unshaded by night's sable shroud.

Then whence is thy splendour fair luminous bow,
From life's golden chalice thy radiance must flow;
Thou look'st from the throne of thy brightness above,
On this desolate earth like a spirit of love.

THE UNICORN.

Of all the fabulous animals of antiquity, whether produced by the fertile and unrestrained imagination of the Persians and Egyptians, or by the more chaste and classic taste of the Greeks, the unicorn is undoubtedly the most celebrated, and has, in the most remarkable degree, attracted the attention and research of the moderns. So strongly are the form and idea of this creature engraved in our minds, even from our earliest infancy, that it requires some degree of effort to persuade ourselves of its actual non-existence; and it is even with regret that we learn that this peaceful being is the mere creature of fancy. It is not, therefore, surprising that the most celebrated zoologists and philosophers of modern times, Ballas, Camiper, and Cuvier, have not disdained to investigate the origin and circumstances of this pleasing fiction, and to search among the productions of nature for the actual animal which suggested the idea of the unicorn. On all hands this is admitted to have been the oryx, an animal somewhat larger than an ass, with cloven hoofs, very long straight horns, a short erect mane, of which the hair is reversed, or grows in an opposite direction from that of all other animals, a light sandy-brown colour, often approaching to pale grey, with shining black marks on the face and cheeks, and a black switch tail,—characters which render this animal particularly remarkable, and which have been accurately described by Appian, and other ancient authors. This compound of the characters of the horse and the goat; the horns and the cloven hoofs of the one, and the erect mane, general form, and long switch tail of the other, is exactly what ancient and modern writers and painters have represented as uniting in the unicorn. A single glance will convince the spectator how small is the difference between the production of nature and that of human invention, or rather how slight are the alterations which have been made in the characters of the oryx in order to represent the unicorn. And it is an incontestable fact, that even these alterations were gradual, and that the first idea of the unicorn arose simply from the representation of an oryx drawn in profile on the monuments of ancient Egypt and Persia. The sculptors of these figures, being ignorant of the art of perspective, could only *represent* a single horn in their profile, though the animal actually possessed two; and these figures being afterwards described, with all their errors of drawing and perspective, by Ctesias, Herodotus, and other travellers, as the representations of existing animals, the idea became universal among the ancients, that Africa and India produced unicorns, which are sometimes represented as horned asses, and sometimes as a large species of goat, with a horn in the centre of the forehead. The Cartazonon of the ancient Persians, figured on the monuments of Persepolis, and described by Ælian, is of the former description, *viz.* a wild ass, with a long horn growing from the centre of the forehead; and the idea is in every respect so perfectly applicable to the oryx represented in profile, that there cannot be the slightest doubt respecting its origin. The size and proportions, the sandy-grey colour, the clean and graceful limbs and carriage, the erect mane, and switch tail, are characters common both to the wild ass and to the oryx; and when it is remembered that both these animals are inhabitants of the deserts of Central Africa, and that, though figured by native Persians, the descriptions of these figures were made and carried into Europe by stranger Greeks, it will be readily admitted that the misnomer of horned ass, and the idea of the unicorn, were but the natural results of the imperfection of the representation, and the ignorance and credulity of their describers. Chance may also probably have contributed to strengthen the idea of the actual existence of the unicorn, if it did not originally give rise to it. It is well known in Southern Africa that the oryx is a most dangerous animal to attack; he defends himself resolutely with his long straight horns, and with such success, that the lion himself dreads to encounter him, and never ventures upon the attack unless irresistibly compelled by the cravings of hunger; even then his temerity often costs him his life, and both combatants have been not unfrequently found dead together from mutual wounds. During the spring season, also, the males never meet without fighting; and as, during these encounters, it frequently happens that one or both lose a horn, it is not at all unlikely that individuals thus mutilated (like the pair seen at Mecca by Belon), and which, from the courage and quarrelsome disposition of the animals, must be sufficiently numerous, confirmed the idea of the unicorn which had been first taken from imperfect representations. The classic taste of the Greeks, having thus got hold of the idea of the unicorn, modified it so as to suit their own conceptions of its attributes of strength and agility; the limbs were lengthened, the heavy asinine proportions were reduced, the head was bent in the attitude of attack, and the horn, instead of growing backwards in the plane of the face, was represented as perpendicular to it, and springing directly out of the forehead. Such is the description of the fictitious animal still represented in the royal arms of England, and such seems to have been the origin and progress of the idea as originating in ancient Persia, and finally spreading over western Europe. The unicorn of the royal arms is, in all respects, the Cartazonon, or horned ass, of the Persians, only differing in more slender and graceful proportions; and those who compare the animal here described, with the beautiful specimen of the Dziggtai, or wild ass of Persia, in the gardens of the Zoological Society, will readily perceive the great similarity of these two animals, and excuse the impropriety of nomenclature by which the unskilled travellers of ancient Greece came to represent the oryx as a horned ass.

The female is more slender and delicately formed, with the horns of greater length; and it is remarkable, that they possess the sagacity of rendering them very destructive as weapons of defence, by sharpening them to a fine point.

THE PALM-HOUSE IN KEW GARDENS.

Previous to the erection of the Crystal Palace, the Palm-House in Kew Gardens was regarded as an uncommon wonder, as in reality it was, and as in fact it now is. It is constructed with similar materials and on the same architectural principle as the Crystal Palace. The Crystal Palace contained the richest productions of art, the Palm-House contains some of the richest productions of nature. No one should visit London without visiting Kew Gardens, and whoever does so will ever remember the Palm-House.

It was erected in 1815, from the designs of Mr. Decimus Burton, under the directions of the Commissioners of her Majesty's Woods and Forests. This vast structure, which is chiefly composed of wrought-iron beams and glass, consists of a rectangular central part, one hundred and thirty-seven feet six inches in length, and one hundred feet wide: with projecting wings, each of which is one hundred and twelve feet six inches long, and fifty feet in width: the entire length is three hundred and sixty-two feet six inches in the clear. The height of the central portions is sixty-three feet, exclusive of the lantern, which rises six feet; the height of each wing is twenty-seven feet to the bottom of the lantern above.

The general form is curvilinear. The main ribs are constructed of deck-beam iron, welded together to the length required, forty-two feet, and bent to the necessary curve. These ribs are twelve feet six inches apart, and foot into cast-iron sockets let into enormous blocks of Cornish granite, upon a foundation of concrete, and are braced together and strutted by wrought-iron tie-rods, passing through tubes of cast-iron that act as purlins, and form a continuous tension-rod around the edifice. The upper ribs foot into strong cast-iron hollow columns, which also receive the upper part of the ribs of the lower roof, and become the bearers for a gallery surrounding the central part, the ascent to which is by a spiral staircase of iron.

The entire glazing is composed of sheet-glass, slightly tinged with green by oxide of copper; that tint having been chosen in order to counteract the injurious effects on vegetation, arising from the scorching influence of the solar rays when transmitted through white sheet glass, which had before been used in most stove-houses. The long-continued series of experiments on the properties of glass, of different hues and manufactures, which led to this arrangement, were made by Mr. Robert Hunt (keeper of the Mining Records in the Museum of Practical Geology), to whom, on the recommendation of Sir William Hooker and Dr. Lindley, the subject was referred by the Commissioners of Woods and Forests.

Due ventilation is provided for by rolling sashes in the roofs, and vertical sashes hung on centres at the level of the gallery, and in the lanterns; fresh air can likewise be admitted through the panels of the stone pedestal of the superstructure. The flooring between the surrounding stone footpaths is formed of perforated castings, each about four feet square, supported on wrought-iron bearers and cast-iron uprights. The house is heated by hot-water pipes, the apparatus being calculated to maintain a temperature of eighty degrees when the external air is at twenty degrees of Fahrenheit. For this purpose, twelve boilers (*from the patent of* Messrs. Burbidge and Healy) have been fixed in two vaults under the house; and twenty-eight thousand superficial feet of heating surface in pipes, tanks, and troughs, laid beneath the whole of the flooring, a distinct set of pipes being supported by each boiler. The vaults communicate by a tunnel five hundred and fifty feet in length, with a lofty ornamental tower, at a short distance from the house, which conceals the chimney-shaft into which the flues are carried, and also contains a large reservoir near the top for the supply of water to the stove. Within the tunnel is also a railroad, for the purpose of conveying coals to the furnaces, and carrying away the ashes.

The cost, exclusive of the shaft, tunnel, &c., was £30,000. The foundation and stone-work were constructed by Messrs. Grissell and Peto; the superstructure and heating apparatus by Mr. R. Turner, of the Hammersmith Works, Dublin.

ECHOES.

SECOND PAPER.

Before knowledge had made much progress in the world, it was very natural that ignorance should view Echo through the medium of superstition. Men were unacquainted with the theory of sound, and, instead of investigating what appeared to be mysterious, exercised their imaginations upon it. Belief, often, as it appears to us, ridiculous, mostly wild, and always imaginative, had a much wider domain than science, and propositions were stated in poetry, not in the strict form required by logicians, and their poetry was allied to faith. Observation and experiment have done much to enlarge the one sphere at the expense of the other, and, in so doing, have seemed to deaden and diminish the poetic spirit; but poetry, like all other things, must accommodate itself to the changing habits of every age; must be heroic in an age of chivalry, amorous in an era of dissipation, and is now called upon to be scientific, and to find its subjects in fact instead of fiction. There is nothing antagonistic in knowledge to poetry; but that which suffices for a time of ignorance will not do for a state of greater enlightenment, and when we lose the ideal of the past, we must wait till the higher standard, which belongs to the future, is developed.

There are many circumstances which either increase or diminish the efficacy of echoes, or, for the time, altogether prevent their action. A high wind, for example, bearing the waves of air in its course, and diverting them, so to speak, from their aim, has a powerful effect. Something is due to the comparative hardness or softness of the bodies from which the sound is refracted; the more impenetrable substance being the most efficient. Thus we have known an echo produced by a dense grove of trees in full foliage, the phenomenon disappearing in winter, when the trees were bare of leaves; but this echo was capricious, being particularly liable to be affected by winds which disturbed the branches as well as the passage of the sound, and except in the cases of very shrill notes, always seemed uncertain and vacillating in its responses. One of the most perfect specimens of this kind used to be found at the foot of the Eastern side of Windmill Hill, at Gravesend, the face of the speaker being directed to the south-east. A single wall is not so likely to produce an echo as one wall behind another, in a parallel line; and a better arrangement still is a hollow building, closed at the top, and somewhat concave in form. This depends upon the same principle as that which causes the tones of a musical box to sound more loudly when placed on a sideboard or buffet, or other hollow article of furniture, than when it stands upon a table or any simple plain surface.

There are three different kinds of echoes, of which, perhaps, most of our readers know instances. In some, where the refracting body is imperfect, either only certain tones are echoed, or others are returned but faintly; in others whole words or sentences are repeated. Both these kinds are known as single echoes, the voice being returned only once, and the first are styled *tonical*, and the latter *polysyllabical*. Another kind are called multiple or *tautological*, from the fact that the response is given many times in succession. Single echoes appear to be produced from rocks, walls, or other substances, while the tautological result from the opposition of many surfaces or cavities, the sound being cast from one to the other, as reflections are multiplied by being given from mirror to mirror.

A correspondent in the Philosophical Transactions tells us of an echo at Brussels, which repeated fifteen times, and adds an account of one still more extraordinary, which he and a party of excursionists met with at a nobleman's palace in the neighbourhood of Milan. This building was in a neglected state and out of repair, and only partially occupied by a peasant. It was a long structure, with a wing on each side, jutting forward, so as to partially enclose the ground in front. A sluggish brook ran before the house, at the distance of some seventy or eighty yards. We have been thus particular in describing the locality, from the extraordinary character of the echo. On a pistol being fired, the writer counted fifty-six reverberations, and a louder report produced no less than sixty. The first twenty were distinct, but after that they became somewhat confused, crowding on each other and occurring two at a time, as though not merely the original sound was repeated, but the echoes themselves begot their own answers. This phenomenon was only observable on one side of the palace, and its full effect was confined to a single spot, where there was a chamber two stories high.

Echoes might be supposed to be frequently met with in rocky and mountainous districts, and, in fact, that is the case. The Honey Rock, near the Cape of Good Hope, repeats many syllables correctly. In Norway, and the hilly parts of the West Indies, they are very numerous. At a tower not far from the Lake of Geneva, a short distance below the town of Lausanne, twelve syllables are returned to the speaker, and the rocks in the neighbourhood of the hermitage of Monserrat are so fertile in the reproduction of sounds, and so easily awakened, that the birds are tempted to sing in answer to the repetition of their own notes, as though emulating the efforts of rival choristers. Among the precipices of the Grisons, on the contrary, echo is unheard. The rushing torrent and the bounding avalanche rouses no response. The icy atmosphere of the region seems to freeze the voice of the classic Nymph, and departed sound appears to be wrapped in the winding sheet of eternal snow, which envelops the craggy rocks. At the north-western base of Arthur's Seat, in the neighbourhood of Edinburgh, there is an echo of such excellence, that a cannon fired from Salisbury Crags, which are immediately behind, is repeated several times with great distinctness and power.

Many echoes are discovered near large buildings, especially those which are irregular in form, and old or ruined. In the county of Argyle, not far from the castle of Lorn, stands a dilapidated chapel opposite a precipice, where echo repeats a whole sentence minutely and distinctly. The well-known rock in the neighbourhood of Muckross Abbey, in Ireland, is famous for its echo. If a bugle be winded, it seems as though a hundred instruments answered to the challenge. The family of the Earl of Abercorn have a cemetery and chapel at Paisley, where there is a beautiful echo The closing of the chapel door is repeated with voices of thunder, and when a musical instrument is touched, a whole orchestra appears to join in the strain. Castle Comber, in Ireland, has an echo of a very peculiar character. It is in a grotto, which gives no indication till within five or six yards of its end, when an effect of the most pleasing kind is produced. At the north side of Stepney Church, in Middlesex, near the well-known figures of the fish and the ring, is an echo which is reported to repeat as many as twenty-one syllables.

Echoes are frequent in the vicinity of rivers and lakes. The Keswick lake repeats the report of a pistol thirty times, fifteen seconds frequently elapsing between each reverberation. The guides show a bridge some few miles from Narbonne, giving twelve distinct repetitions, and there are many of a similar kind upon Lake Ontario. Almost every one acquainted with the sea coast is familiar with that most sublime of echoes, which in a low murmur repeats the noise of the waves, as though the ocean spirits were holding whispered converse with the spirits and fairies of the earth.

Although science, which invades the realm of imagination, and plays sad havoc with the poetry which ever belongs to mystery, has disassociated echo from superstition, and divested it of supernatural attributes, by making us to a great extent aware of the causes which produce the effects, and enabling us to call them into action, yet we cannot be at all surprised at the feeling of awe such phenomena inspired among rude and ignorant men, nor wonder that the ideally disposed Greeks enlisted Echo among their deities and spirits, as they did so much that was graceful and sublime in nature. Even now, with all our wisdom, there are few persons of sensitive temperaments, who can stand at night beneath the starry vault of heaven, when nature seems wrapped in sleep, guarded by watchers at the bright fires above, and listen to the voice of old ocean rising up from the shingly beach, or hear their own accents come back to them from some massive rock, without experiencing sensations which lift them out of their daily life of business or pleasure, into nearer, more earnest, and heartfelt communion with the Omniscient Power, who framed the laws to which the subject earth, with its myriads of life and varied phenomena, yields a willing and passive obedience.

REMARKABLE INSTANCES OF LONGEVITY.

THOMAS PARR, as recorded by Lord Francis Bacon, was born in 1483, and died in 1635, aged 152 years. He died not from the disease or decay of a single organ, but from two great fulness of blood, caused by more than usual indulgence in eating and drinking. He had led an active country life, and enjoyed country air and exercise; but was invited to London, where luxurious eating and drinking soon finished him. His body was examined by the celebrated Dr. Harvey, discoverer of the circulation of the blood, who has left an account of the examination. Parr enjoyed good health for a century and a half. Thirty-five years after the death of Parr, Henry Jenkins, of Yorkshire, England, died, aged 169 years. He was born in 1501, and died in 1670. His age is fully authenticated, and is the greatest among the moderns. John Effingham, of Cornwall, England, died aged 147 years. James Lawrence, a Scotchman, lived 140 years. About the year 1790, Joseph Surrington died at Bergen, Norway, aged 160 years. In 1772, a man named Drakenburg died in Denmark, in the 147th year of his age. In 1825, Pope Leo XII granted to a poor man living near Lake Thrasimene, in Italy, a pension on account of his great age; he was then 125 years old. He died aged 130 years. In 1830, a man died at St. Petersburgh, aged 130 years. I knew a man in the island of Cuba who was 120 years old; he was able to ride on horseback 60 miles in a day, and return home the next. We will now turn to America. In 1820, a man named Henry Francisco died at Whitehall, in the state of New York, aged 134 years. He beat the drum at the coronation of Queen Anne, and was then 16 years of age, he did not die of old age, but of the ague and fever. I forgot to mention the name of Dr. Mead, who was consulting physician to Queen Elizabeth, and died at the age of 148 years. John Hightower, residing in Marengo county, Alabama, died January, 1845, aged 126 years. William Prigden, of Maryland, died October, 1345, aged 123 years, A Mr. Blakewell, residing near Grenville, North Carolina. was living a short time since at the age of 136 years.

THE DESERT AND THE CARAVAN

THE OASIS

THE sandy deserts of Africa form the chief features of travels in the East. From the hills of Ouida as far as Mecca, where the tomb of the holy prophet is, the whole of Negad is a sandy plain, diversified here and there with towns and villages and fertile spots, the remainder being a sterile and forbidding desert. Sand, sand, sand, on the right hand, on the left hand, before, behind, under foot, in the air, everywhere but above, where the burning sun shines, and that blinds, scorches, dries and parches, as if the sun itself was a globe of sand white hot. No water, no tree, no hum of insect, no whirring wing of bird, no signs of human or animal life, but sand, sunshine, boisterous wind, omens of desolation and preshadowings of death. Such is the desert, when encountered by human eyes and human feet, sterile, blank, terrible.

The great desert is known to travellers as THE SAHARA, and extends on both sides of the tropic of Cancer, having its main direction east and west, and including more than a fifth part of the African territory, from the west coast of Africa, and between Morocco on the north and Senegal river on the south, this wilderness extends easterly to the Red sea, contracted on the west by the kingdom of Fezzan, and on the east by the valley of the Nile. It embraces a space of more than 46 deg. of longtitude and 150 of latitude, and has a length of 3,000 miles by a breadth of 1,000 miles.

"Now the naked rock" says Humboldt, "appears to view perfectly smooth and level, which the travellers may pass over for days together without meeting even a grain of sand, where one sees only the heavens above and the hard stone pavement beneath; now we behold a flat plain covered with rolled pebbles, here and there intersected with ravines and valleys, extending to about thirty feet beneath the surface; and now an ocean of sand presents itself, frequently containing so large a quantity of salt, that whole tracts appear coated with it, and resemble fields of ice. Occasionally spots of verdure are found, known under the name of Oases, which display palm-trees and springs of water," forming a striking contrast to the arid sterility around it, as have too, become apt images for the poet, and a subject of frequent comparison with the rhetorician:—

What a desert-like spot would this life of ours be,
If amid sands of sun, no glimpse could we see
Of some green knotted garland of grass;
No oasis brighta hope to impart,
That the sun of the eye, and the sun of the heart,
Still abide in the road we must pass.

Weary with travel, half-blinded, half-choked by dust, parched with heat and thirst, how gladly does the traveller turn from his course to one of these welcome spots when they come within his view. From the glaring region of loose sand, haunted by the sirocco, the sand storm, the mirage; strewn with the corpses of thousands who have perished on the way before, he steps abruptly into a region of green and cool enchantment, where the pellucid waters reflect the trembling leaves of overshadowing date trees, and the blinding glare of the sunlight is shut out by a thousand interweaving branches, all laden with the loveliest of fruit, while the air—while over the sand was like the blast of a furnace—all is here cool and fragrant, filled with

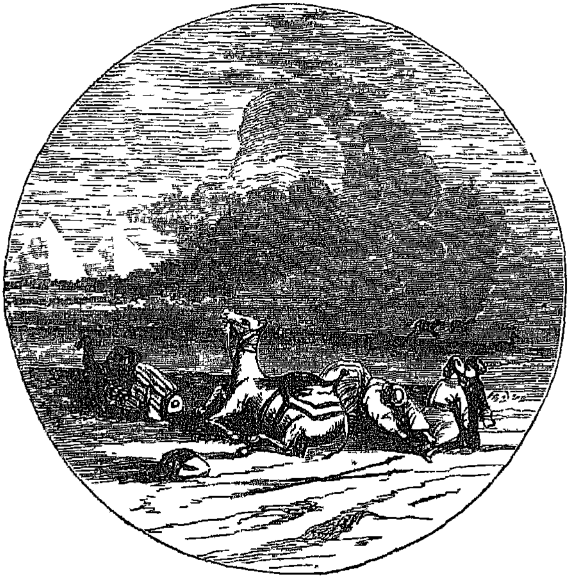
A flow of odours from the jessamines,
Just as if Nature's incense-pans had spilt
And shed dews in the air.

With the exception of these spots, the Sahara is quite uninhabitable for man; and it is only at periodic times that it is traversed by the trading caravans, which proceed across it from Tafilet to Timbuctoo, and from Fessan to Bornou. The oases themselves are rare, and such few as exist are scarcely permanent. Sometimes they are entirely parched up, and offer nothing to the pilgrim but a little brackish water, or salt mud, though at other seasons oases form in new spots, and are quickly surroundedby vegetation, which help to preserve the water from rapid evaporation.

The great desert may be said to be rainless, as only in certain regions towards the Nile does rain ever fell. Its winds are analogous to the trade winds already described, as prevailing in certain districts of the ocean, and move invariably from east to west, in which direction the great clouds and pillars of sand are blown. The *acacia vera*, or Egyptian thorn is almost the only plant which this immense region produces, and only in the oases such as that which lies in the centre of the desert between Lebanon and Euphrates, is anything but the most stunted vegetation produced.

The author of Eöthen thus describes a day in the desert—"As you are journeying in the interior, you have no particular point to make for as your resting place; the endless sands yield nothing but small stunted shrubs. Even these fail after the first two or three days, and from that time you pass over broad plains; you pass over newly reared hills; you pass through valleys that the storm of the past week has dug; and the hills and the valleys are sand, sand, sand, and only sand, and sand, and sand again. The earth is so sandy that your eyes turn towards heaven—towards heaven, I mean in the sense of pity. You look to the sun, for he is your task-master, and by him you know the measure and the work that remains for you to do. He comes when you strike your tent early in the morning, and then, for the first hour of the day, as you move forward on your camel he stands at your near side, and makes you know that the whole day's toil is before you. Then for a while, and for a long while, you see him no more, for you are veiled and shrouded, and dare not look upon the greatness of his glory; but you know when he strikes the head by the touch of his flaming sword. No words are spoken; but your Arabs moan, your camels sigh, your skin glows, your shoulders ache; and for sights you see the pattern and web of *the silk that veils your eyes, and the glare of the outer light.* But conquering time marches on, and by-and by the descending sun has compassed the heaven, and now softly touches your right arm, and throws your lank shadow over the sand, right along the way to Persia."

The passage across the desert is accomplished by means of



THE CARAVAN,

which sometimes consist of an immense number of men and camels united in the journey for common safety and succour. The way is perilous and fraught with the dangers of hunger, thirst, and poisonous wind, as well as the predations of roaming banditti. The camel called in the warm language of the Orientals, the "ship of the desert," is so well suited in its structure and habits to the dreary character of these regions, as to form the natural means of locomotion A powerful frame, capable of sustaining privation such as would utterly kill the horse; joined to a patience under suffering, a tractableness, and a peculiar self instinct, all fit it for the strange life it leads as the "ship of the desert."

Born for the desert, the camel possesses on its knees thick callosities, which enable it to kneel on the sand to rest or to receive its cargo, without fear of splitting the skin. Its strong nipper-like teeth enable it to crop the tough herbage which springs up here and there in the waste, and its nostrils are so formed that it can essentially close them against the sand-drifts and poisonous winds of the desert. But the provision most truly marking it as a creature of the sandy waste and characterising it as a wonderful example of adaptation, is that of its cushion-like foot, which spreads out with the pressure of its weight, and allows it to proceed without the least danger of sink-in the sand.

There is something intensely poetical in the march of a caravan across the desert. The camels move in stately procession and with mathematical precision of footstep, each having his own place, which he never quits, unless himself, or his predecessor, whose tail only he has made acquaintance with, falls from exhaustion on the march. The sublimity of the procession, is brightened by the loneliness of the scene all round, for the desert is so flat and bare, and glaring in the sun, that it seems as if the fated few, moving in solemn procession to the low tinkling of the camel bells, were all that existed in the wide world, and that even they were speedily to perish. The soft pastoral sounding bell which hangs on each camel's neck, relieves the monotony, and sometimes the song of the Arab driver as he sings to his favourite camel, while sharing with it his dates and barley bread, gives an air of strange romance to the adventure and almost lifts it out of the region of reality.

But it is real, and painfully real, for the caravan which sets out from Cairo, or some other city, on a mission of commerce or religion, well-armed and equipped for the difficulties of the way, often terminates its career in the midst of the desert, overtaken by a sand storm and converted into a ghastly heap of whitened bones In 1805 an akkabah or caravan, consisting of 2000 persons and 1,800 camels, was cut off suddenly by the Simoon, which came with darkness and overwhelmed the caravan, absorbing all the water in the skins borne by the camels, and suffocating its victims by burning blasts and intolerable thirst.

The hadj or pilgrim caravan moves only by night, and chiefly by torch light, and such travelling is considered the perfection of luxuriance. The caravan of the mother of Abassides numbered

120,000 camels. 900 camels were employed in merely carrying the wardrobe of one of the Caliphs, and others carried snow to cool the sherbert. "The Sultan of Egypt," says Mr. Broderip in his recent work, "on one occasion was accompanied by 500 camels whose luscious burdens consisted of sweetmeats and confectionary only, while 280 were entirely laden with pomegranates and other fruits." Even so late as sixty years since, a pilgrim caravan of Cairo, was six hours in passing one who saw the procession. The departure of such caravan, with its thousands of camels glittering in every variety of trappings, bells and streamers—men with kettle-drums, flutes and flageolets, walking by their sides, some with glittering ornaments and silver bridles, others in the nodding plumes of ostrich feathers, to say nothing of the sacred camel, decked with cloth of gold, led by two sheiks in green, with the ark containing the Koran, written in letters ot gold—forms a dazzling contrast to the spectacle it not unfrequently presents before its mission is fulfilled. Numbers of them drop and die miserably, for want of herbage and water; and when the pilgrimage leaves Mecca, the air is often tainted with the effluvia reeking from the bodies of the camels that have sunk under the exhausting fatigue of the march.

"Take care," says one, "or you will stumble over death's victim. Leave the road, you perish; follow the track of the caravan, and rotting carcasses are its milestones. Why is the voice of the caravan so hushed, and why do you urge your camel's speed? See your spirit is wounded; you are musing on a secret in your own breast, and yet it is known to all. Look at that horrid object that lies in your path, his head turned back, and his mouth wide open; he wanted water, death has mocked him and choked him with sand; he wanted air, the wind is laughing through his ribs; he struggled to reach his journey's end, and his feet are striking in the air." So we go travelling over the desert, hot and parched as the sand we tread, and thinking perhaps of the lines,

"Should you ever be one of a thirsty band,
With your head to the sun and your feet to the sand,
Traversing the desert,—ah, then you may tell
What treasures exist in the cold deep well;
Sink in despair on the red parched earth,
And then you may reckon what water is worth."

ALPINE FLOODS.

AMONG the many dangers to which the inhabitants of the Alps are exposed, not the least terrible is that of floods, which are produced in the following manner. Sometimes large masses of ice and snow slide and fall from the mountains, so that they intercept the course of a river. Little by little this barrier augments, sometimes accumulating through the course of many years, till at length the river, which at first trickled through, or dashed over the obstacles in its way, is completely cut off from its channel. In more level countries the consequence would most probably be, that the stream would turn aside, and force or wear away for itself another track, but here rivers run through deep gorges of the mountains and low lying valleys, and the steep banks on either side, mostly composed of hard unyielding materials, shut them in so that escape becomes impossible. Behind the natural dam thus formed the waters begin to rise, each day augmenting the floods pouring down from the higher ground. This continues for some time, the inhabitants aware of the impending danger but unable to avert it, and at last the increasing weight of water breaking down the wall, or by its gradual action weakening and wearing it away, bursts through all constraint and dashes down the valley with the fury of a torrent, sweeping away in one general ruin houses, bridges, cattle, crops—the painfully formed gardens of the peasantry, and sometimes causing a fearful sacrifice of human life. The calamity caused by the bursting of the Holmfirth resorvoir in Yorkshire, with the circumstances of which the public have been made fully acquainted, will give the reader some idea of one of the perils to which the inhabitants of the Alps are exposed from the action of natural causes.

The Val de Bagnes near Martigny has been twice, at least, the scene of such a disaster. It is a narrow rocky glen, running some thirty or forty miles from east to west, and is situate in the mountains between Piedmont and Switzerland. Through the lower grounds of this valley flow one of the tributary streams which feed the Rhone, known as the Druse. The banks are steep and precipitious, and the surrounding ground rugged, but wherever there is a little level ledge or terrace capable of having earth piled upon it, the industrious and persevering Swiss have established little gardens, and built up those pretty picturesque cottages which our artists have made so familiar to the English eye, and of which we have so many imitations here. These relieve the rugged appearance of the country by patches of green lying along the mountain sides, and from steep to steep, over the river foaming far below, rude, slender, rustic bridges are hung, which serve as the means of communication between the scattered inhabitants of the mountain community.

Near the upper end of this valley one of the glaciers with which these mountains abound, pushes down its masses of ice close toward the river, and from time to time sliding blocks of ice and rolling heaps of snow intrude into the stream, which is generally more or less impeded by these obstacles. In the year 1505, tremendous quantities of ice and snow came down, and the river was completely blocked up. The water rose to a great height, and on the evening of Sunday the 4th of June, the dam broke down. In a moment the valley was a flood, the roaring waters sweeping away everything in their path. The town of Martigny was entirely destroyed—a great number of the inhabitants lost their lives, and the remainder by the destruction of all they possessed in the world, were thrown into the most abject poverty and distress.

After this event nearly three centuries passed away, and the great flood of the Val de Bagnes became matter of tradition. Industry had repaired the ravages of the torrent. The pretty gothic cottages raised their pointed roofs again, gardens had been re established on the slopes and ledges, and bridges spanned the chasm between the beetling precipices. But all this time those old antagonists, the river and the glacier, had been preparing for a new encounter. The glacier continued to push its way downward, and the ice and snow to fall into the river till at length a sufficient bulk had been accumulated to resist the action of the water, and the heat of the summer sun. For a long while, as before, the river only rendered more turbid and rapid by opposition, chafed and foamed and made its noisy way in its restricted path; but by and bye, as had been the case 313 years before, the obstacles were piled up too high for it to overleap, and too compactly to allow it to creep through. The strength of the barrier may be judged of from the fact, that it was 68 feet in thickness. So came on the April of 1818, and the people began to awake to a sense of their danger, and to talk among themselves over the old tales of what had happened in the olden time. The 300 years of time had, however, brought with them greater knowledge and increased skill, and by the period that a large lake had formed, the surface of which had risen sixty-two feet above the ordinary level of the river, it was resolved to take decisive and energetic steps to avert the impending calamity.

It was however, no easy task to deal with such a body of water as had gathered together. It seemed almost as presumptuous for mortal man to attempt to control it, as it was for the venerable Mrs. Partington to set herself to work to mop out the ocean. The lake was 700 feet across at the top, tapering down to 100 feet at the bottom—its average depth was 200 feet, and it was estimated to contain 800,000,000 cubic feet of water. If indeed the walls of this vast reservoir had been composed of stone the danger would have been small, for the worst that could have happened would have been that the water, rising above the top, would have dashed harmlessly down in a beautiful cascade, thus checking its own increase, and not overflowing sufficiently to flood the valley. But the walls were only of snow and ice but strong for a time, and sure eventually to give way under the friction and wear and tear of the elements. In this strait, an engineer of Martigny, named Venetz, proposed the bold scheme of driving a tunnel through the wall, at a height above that to which the water had risen, so as to provide an outlet by which the lake might be gradually drained, or at least prevented from getting larger. The undertaking was full of dangers and difficulties Our own railway enterprises have made us familiar with tunnels much greater in length, but they are through solid earth. Here the task was to tunnel through snow and ice—to penetrate into a congealed mountain. The workman would be in constant danger of being buried by the fall of the brittle substances—the glacier above was every now and then sending down sliding masses, and the snow-drifts their rolling avalanches. Then too, they might burrow into the gaping chasms of an internal cave, such as are known to exist below the surface of glaciers, and lastly the lake might reach the point at which the tunnel was to emerge, before it was completed. However, there were bold hearts and strong hands, and the greatness of the peril nerved them against minor dangers. The work was commenced on the 10th of May, and completed on the 13th of June, before the lake had risen to the height of the opening. M. Venetz did not wait for the waters to rise higher, but set to work to cut down the mouth of the gallery so as to meet them, and on the 14th had the satisfaction of seeing the flow take place.

We may easily imagine the eagerness with which the progress of this operation was pushed on; the thrilling anxiety with which it was watched, the gladness when it was completed, and the joy when the dreaded waters began to run peacefully through the channel. Cowper writes—

"Hard fate of man, to toil for the reward
Of virtue, and yet lose it!"

and M. Venetz, and those who laboured with him, had the mortification in the end of seeing that all their skill and courage were insufficient to diminish the evil. On the 15th of June, the water had sunk ten feet, and on the 16th forty-five feet, and all were bright with hope that the danger was averted; but an operation was going on which had not been calculated for, and which it was impossible to guard against, and soon shewed its effects. The barrier had, of course, been weakened by the cutting, and the stream flowing rapidly through, wore away the sides and continually enlarged the opening, so that hour by hour, the stream became larger. Penetrating the crevices the water undermined the glacier, bringing down immense pieces of ice, and still further diminishing the strength of the wall. This went on till the cone of ice was cut through, and then the frozen heaps on the mountain side were assaulted—the loose materials of the bed of the river upon which the foot of the glacier rested were disturbed and shifted, and by degrees the water forced an opening between the glacier and the mountain. When this was done, out rushed the torrent which there was then no power to stay. The remaining wall of ice fell down with a noise louder than that of the artillery upon a battle-field, and in less than half an hour the lake had emptied itself. The whole valley in less time than it takes to write the fact, became a raging sea. At first a narrow gorge, over which a bridge was thrown, at an elevation of ninety feet above the river, offered some impediment; but the surging waters, rising with almost inconceivable rapidity, swept away the bridge, rushed over the wider part of the valley, forced another defile, and unrestrained by any other impediments rolled on till they reached the Rhone at Martigny. In its passage it swept away everything in its track—gigantic rocks toppled over and bounded away before it like playthings in the hands of a giant—forests fell faster than beneath the axes of a legion of foresters—houses were taken away without resistance—the ruins of agricultural buildings floated around, and the very soil of the cultivated lands was borne off; and when the waters disappeared, they left nothing behind them but a rocky, sterile, bare wilderness.

It is probable that the valley of the Val de Bagnes will never again be the scene of a similar catastrophe. It will still remain exposed to sliding glacier, and the rolling avalanche, against the visitations of which the ingenuity and power of man are totally insufficient to provide a remedy; but the attempt of M. Venetz to avert the flood, only failed because it was commenced too late to be effectual, and if vigilance be exercised, and energy exhibited, when the first signs of dangerous accumulations of water are observed, the Swiss peasant may build his house and cultivate his garden on the rocky terrace in peace, secure at least that the bursting of a lake will not expose his life to danger, and sweep away all the results of his patient industry.

THE FALL OF THE ROSSBERG.

Opposite to the Righi-berg, on the north-east side of the valley which leads from the lake of Zug, at Art, in the canton of Schwitz, is the Ross berg, rising 3,600 feet above the lake, by the fall of a portion of the summit of which was occasioned the dreadful disaster of the 2nd of September, 1805. Great part of the valley between the Ross-berg and the Righi, together with five or six villages, comprising, together, 111 houses, was buried by this fall. Besides the great number of unfortunate persons wounded and crippled, no fewer than 457 perished outright. Of the multitudes overwhelmed by the ruins of the mountain and of their houses, only seventeen could be dug out alive, and restored to life. The fragments of the mountain descended with such force and rapidity, as to reach the little lake of Lowertz, in the valley, distant from the summit, south-east, a league and a half, and to the base of the Righi on the south, distant about a league and a quarter. The lower extremity of the materials brought down, measured along the base of the Righi to the lake, is a little more than a league. The Ross-berg is wholly composed of strata of breccia, or pudding stone, parallel to one another, but dipping to south-east at an angle of twenty-five or thirty degrees, and separated by thin beds of marl. When these substances are moistened by the filtration of rain water, and are changed into viscous mud, the layer of stone, resting on them, has a tendency to slide down, just as we see a ship slide from the stocks into the sea. Accidents of this kind had formerly happened in the valley; but by the course of time the vestiges had nearly disappeared, and been forgotten. But since the disaster of 1805, the symptoms of a similar accident are so well known, that few lives can probably be lost by them.

The summer of that year had been extremely rainy, and it had rained hard the day of the accident, and the evening before. In *the morning a number of crevices were observed in the slopes of* the mountain, and a cracking noise was heard from the interior. Little eminences appeared in what had before been smooth turf, which opened and ejected stones. Small portions of rock, from time to time, detached themselves from the upper part of the mountain, and descended to the base. At two in the afternoon, a large rock rolled down, with great noise, raising a cloud of black dust in the air. At the bottom of the mountain the ground seemed to be in motion, and crevices and cracks appeared where it was touched. A peasant, working in his garden, seeing the spade which he had stuck into the ground moving of itself, fled with precipitation. Soon afterwards an opening appeared in the slope, which gradually, but very slowly, enlarged itself; the springs ceased to flow; multitudes of birds took to wing in great disorder, uttering shrill unnatural screams.

A little before five in the afternoon every symptom of some awful catastrophe became more and more manifest. At intervals the upper part of the mountain seemed to slide down as on an inclined plane, but still very slowly, and frequently it stopped altogether. An old man, who had often foretold the approaching disaster, was quietly smoking his pipe, when he was informed that the Ross-berg was falling. Going out of his house to look at it, he returned, saying, he had time to fill his pipe a second time. The neighbour who had given the alarm continued his flight down the valley, but was thrown down several times, and with difficulty escaped. On looking back, the house of the old man had disappeared.

An inhabitant of one of the villages that were destroyed was at the door of his house, built of timber, with his wife and three children, at the moment of the great explosion. Snatching up two of them, he called to his wife to follow with the other; but she staid an instant to fetch out a fourth, Marianne, aged five years. Frances Ulrich, the female servant, took Marianne by the hand, and hurrying her along, "in an instant," as she said afterwards, "the house seemed to be torn from its foundation, and to turn round on itself like a reel; so that, at one time, I found myself on my head, at another on my feet, and the day became as dark as night."

Being separated from the child, by the violence of the shock, she remained suspended among the ruins, her head downwards, and her body squeezed on every part, her face bruised, and suffering very acute pain: she imagined herself to be buried alive at a great depth under ground. After many efforts, the poor girl succeeded in extricating her right hand, with which she wiped her eyes streaming with blood. In this horrible state she heard the groans of the little Marianne, and called to her. The child answered, explaining her situation, that she was lying on her back in the midst of stones and bushes; that she was unable to rise, but that her hands were at liberty, and that she could perceive the daylight, and even the green fields. "It is the day of judgment," answered Frances, "there are none but ourselves in the world; we also shall soon die, and then we shall be happy in heaven;" and then they prayed together.

After a long time, the sound of a bell was heard, which she knew to be that of a neighbouring village, and afterwards seven o'clock struck, all which convinced her that there were others in the world beside themselves. She now endeavoured to comfort the child, who cried for her supper; but by degrees Marianne's voice grew weaker, and Frances heard her no more. Hanging with her head downwards, surrounded with wet earth, she sufferred insupportable pain from the cold in her feet. She at last, after many efforts, disengaged her legs, which, no doubt, preserved her life. Many hours passed away in this dreadful state, when she again heard the voice of the child, who had fallen asleep, and now again began her cries and complaints. The unhappy father, who had with the greatest difficulty saved himself with the two children, one of whom had been, for a moment, involved in the rubbish of the mountain, came back at day-break to search among the ruins for the remainder of his family. At a distance of 500 yards from the spot where his house originally stood, he discovered the dead body of his wife, one of her feet appearing above ground, who it would seem had been suffocated with the child in her arms. His loud lamentations, and the noise he made in endeavouring to extricate the bodies, were heard by the little Marianne, who lay near the spot, and who called to him with all her might. She was found with a broken leg, but nevertheless was wholly occupied about the servant, whom she knew to be at no great distance. She also was drawn from under the ruins, but in such a state that little hopes were entertained of her recovery, and, for a considerable time, she continued subject to convulsions and fits of terror. An infant of two years of age was found safe and sound on its mattrass, resting on a muddy pool; but not a vestige of the house in, which the infant was at the time of the catastrophe could be traced.

The rocks and stones thrown all the way to the lake of Lowertz a league and a half from the Ross-berg, filled up a considerable part of it, and drove back the water with such violence that, rising up like a wall, and passing over the isle of Schwanau, on which, very lately, lived a hermit, and which was about seventy feet higher than the common surface of the lake, this tremendous wave invaded the opposite shore, sweeping houses and inhabitants to a great distance on the lands of Schwitz; and, on its return, carried many others back into the lake. The chapel of Olton, constructed of timber, was found half a league from the spot where it formerly stood. Many large blocks of stone were lifted up and removed to a distance.

The most considerable of the five villages on the base, and in the valley of the Ross-berg, which were buried under the ruins of the mountain, was Goldau, which has since given name to the whole catastrophe. A company of eleven persons, of the principle families of Berne, went to Art, on the lake of Zug, on the 2nd of September, in the view of making an excursion to the summit of the Righi-berg, and proceeded on foot a few minutes before the accident took place. Seven of them had gone forward two hundred yards before the others, and had entered the village of Goldau. They were seen by the other four, pointing up to the summit of the Ross-berg, where a singular commotion was perceptible at the distance of a league. These last stopped to examine the phenomenon, with a pocket telescope. At the instant stones began to fly through the air, over their heads, like shot from a cannon; a thick cloud of dust filled the valley, and concealed every object; a horrible noise was heard, which made them flee for safety. When the dark clouds were somewhat dispersed, the four returned towards Goldau; but fragments of rock and dust, from the mountain, to the thickness of a hundred feet, completely covered the village, of which not a vestige was to be seen, the whole tract being one mass of ruins. One of the four called and lamented his young wife, another his son, a third, the two young gentlemen of whom he was the preceptor. Every exertion was made, but in vain, to discover the unfortunate sufferers. After some time the bell of the church of Goldau was found three quarters of a league from its original position.

It was remarked, that the torrents of mud from the Ross-berg, less susceptible of impulse, made their way down the hollows to the lake of Lowertz; but that the solid fragments of rock continued their course right across the valley, and up a considerable way to the base of the Righi. The trees were cut in many places, as if they had been exposed to a canonade.

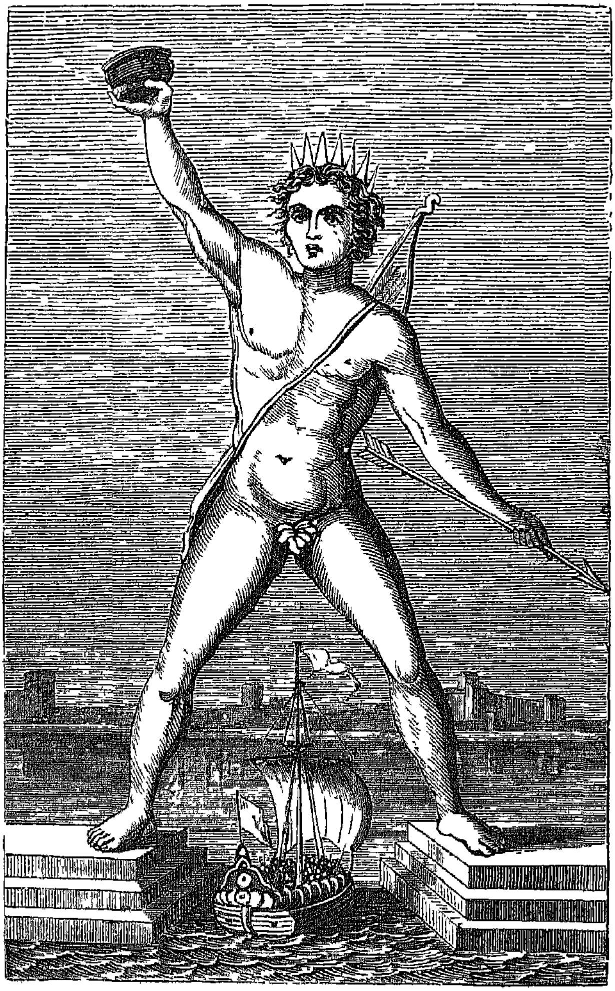
THE COLOSSUS OF RHODES.

THE beautiful Island of Rhodes, which forms a part of the Greek Archipelago, was formerly the abode of one of the most enterprising commercial people in the world. With the exception of the Phœnicians they carried on the most extensive commercial transactions, and their strength as a naval power was unrivalled. Rhodes belonged to the Greek dominion, and in common with the rest of that classic land has exercised an immense influence over the destinies of modern nations. Those who are acquainted with the science, literature, and art of Ancient Greece, know that they mainly constitute the basis of the superstructure of knowledge which has been reared up in Europe. Her classical lore enters into the education of youth, and delights those of maturer years. Her mythology furnishes themes for poets, allegories and comparisons for writers, and orators, and subjects for artists. Her plays rule the construction of the legitimate drama. Her philosophy is unsurpassed, and though her painters have left none of their efforts to our time, the less perishable works of her sculptors and architects yet remain, and embody an ideal of beauty and expression which the best of modern art in those departments only approximates towards. To Greece, the land of the beautiful, the brave, and the wise, fallen as she is, we look with reverence as the cradle of intellectual power.

It may not be so well-known to many that the traces of the wisdom of the Rhodians, in their special province, are still to be found among us. Their naval code was so wisely framed that it was celebrated among their contemporaries, and the practical Romans not only adopted it in its main features, but also in most of its details, and from them it has been handed down to the present time, and still continues to be the foundation of the laws and usages by which the maritime relations of the most commercial nations are governed.

Rhodes, however, did not owe its naval and commercial predominance solely to the qualities of its people, part being due to the advantages of its situation. Placed about twenty miles to the south of Caria, its position peculiarly fitted it for a large traffic, and even now when comparative obscurity and poverty has succeeded to former power and opulence, it is still the most convenient entrepot for the trade of the Levant. The harbour, too, is one of the best to be found in those seas, and possesses a basin almost in the form of a crescent, the horns nearly approaching to each other, so as to protect the outlet.

Commerce always brings wealth, and the Rhodians became celebrated for their magnificence. Riches were not quite so safe in those days, when Rhodes was a powerful state, as they are in the nineteenth century. The possession of treasures always marked out those who amassed them, as the prey of ambitious potentates, and warlike adventurers, and the Rhodians were exposed to many dangers. It is recorded, that Demetrius Poliorcetes, made war against them and beseiged them for a considerable period, but they were a valiant as well as a thrifty race, and had well fortified their island, so that after vast treasures had been wasted, and much blood had been spilt on both sides, the invader



THE COLLOSSUS OF RHODES.

was foiled and compelled to withdraw defeated from his enterprise. It is probable, that upon this, as upon other occasions, mercenary forces were employed to defend the riches which had been won by adventure and industry.

Among the other works which attested the prudence of the inhabitants, was one which made their harbour almost impregnable from the seaward-side. We have already mentioned the natural advantages of its crescent-like form, but these were increased by art. Upon each of the horns which approached so closely to each other, a mole of solid masonry was constructed, jutting so far out into the water that scarcely more than sufficient room was left for an ancient galley of the largest size to pass between the lofty walls. Such an approach so easily defended, almost defied the assaults of the boldest enemy. It is but seldom that those who have risen into opulence, are content with mere usefulness. The imaginative Greeks were the least likely of all to be satisfied with mere utilitarianism, and it was determined that a magnificent monument should grace the entrance of the basin. The result was the erection of the colossal statue, with which the name of Rhodes has been since associated, and which was justly considered one of the wonders of the world.

The artist selected was named Charles, a native of Lindus, one of the most important cities of Rhodes. He was a pupil of Lysippus, a native sculptor, and though no other memorial of him than the memory of the Colossus has come down to us, that is sufficient to mark him as a genius of no common order. The statue was formed to represent the God Apollo, and in addition to the imposing effect produced by its immense size, was a model of artistic skill. Full justice was done to the traditional beauty of the most attractive of the male deities of Greece. With a foot upon either mole, the vast mass reared aloft its exquisite proportions, casting its shadow far over the waters, and forming a landmark visible at a vast distance, to the mariners of those sunny seas. Behind the back of the God was slung his bow—in his left hand he held a barbed arrow, and in his right, bore aloft a flaming censer. The noble countenance was surrounded by clustering curls, and the head surmounted with pointed star-like rays. The height of the statue was seventy cubits, or about 105 of our feet, and there was sufficient height between the legs, to allow galleys to sail through, without lowering their masts.

In order to estimate its vastness in relation to what now meets our eye, we must institute a comparison, not with the works of statuaries which meet but with the height of public buildings. Imagine then, the representation of Apollo, which strode across the harbour of Rhodes, more than half the height of the Monument, or one-fourth that of St. Paul's. The interior of the statue contained a winding staircase which led to the top, from whence, by the aid of glasses suspended round the neck, vessels on the coasts of Egpyt and Syria could be seen.

The material of which the Colossus was composed, was of brass of the finest quality, and its cost must have been immense, independent of the payment of the artist and the labour employed in its erection, for when Rhodes became a Roman dependency, the remains of the statue were found to weigh 720 thousand pounds, and were sold to a Jewish merchant of Odessa, for a sum equal to £36,000 of our money. Great as we moderns undoubtedly are in intellectual acquirements, there are many secrets of ancient art and mechanical power which are lost to us. We may instance the process of embalmment practiced by the Egpytians, and the preparation of those wonderfully enduring colours upon the walls of their tombs, which after a lapse of thousands of years shine out as vividly to the eyes of those who penetrate the olden burial places of the dead, as they did to him who first beheld them. We are at a loss too, to imagine the mechanism by which the vast blocks, out of which Egyptian colossal monuments are sculptured, were extracted from the quarries and conveyed to the spots where they still remain, and the exhumation of the buried cities of Assyria—now the haunt of the wandering barbarian—discover buildings constructed of stones so gigantic, that the engineer of to-day wonders how they were raised to the positions they have occupied for ages. By what means the Colossus of Rhodes was cast, we cannot now even conjecture, and we are equally ignorant of the mode adopted to raise it to the position in which it was placed. We know of nothing in the history of recent mechanical efforts which may compare with this achievement.

The period assigned as that of the completion and fixing of the figure, is about 300 years before the commencement of the Christian era, when our Island was the abode of naked savages, sunk in the grossest barbarism. Its endurance was not in proportion to its magnitude, for it only lasted about the life of a man. Authorities disagree as to the exact time, some stating it to be fifty-six, others, eighty-eight years. Which computation is now the correct one, cannot now be ascertained, but if we assume the longest to be right, it was an ephemeral duration for a work upon which so much skill and cost had been lavished. An earthquake took place about 224 years before Christ, by which the statue was much damaged, and we may suppose that the wealth, or the public spirit of the citizens had diminished since its erection, for it does not appear that fit efforts were made to restore it to its original condition, and it remained in ruins for nearly 900 years. Still, the disaster was not viewed with indifference, for we learn that the Greek people partly moved to rescue so important a work of art from complete destruction, partly incited by respect for the deity it represented, set on foot a public subscription for its restoration. The inhabitants of Rhodes gladly acceded to the proposal, and contributed to the object—a large sum of money was actually collected, but unfortunately, it fell into bad hands. The receivers were more intent upon enriching themselves, than rescuing one of the glories of their country from destruction. Upon various excuses, they delayed from time to time the commencement of the repairs, till the excitement had abated, and then calling superstition to their aid, they informed the deputies of Greece, that it was not the will of Apollo the statue should be re-instated, and that the God had declared his disinclination through the Oracle at Delphi. How far their statement was credited we are not aware, but it is probable that part of the money collected was employed to procure from the Oracle the desired response, and that many bowed in submission to the revelation. However that may be, the conspirators appropriated the money which had been collected, to their own use, and left the statue to its fate, and it does not appear that any effectual attempt was ever made to compel its restitution.

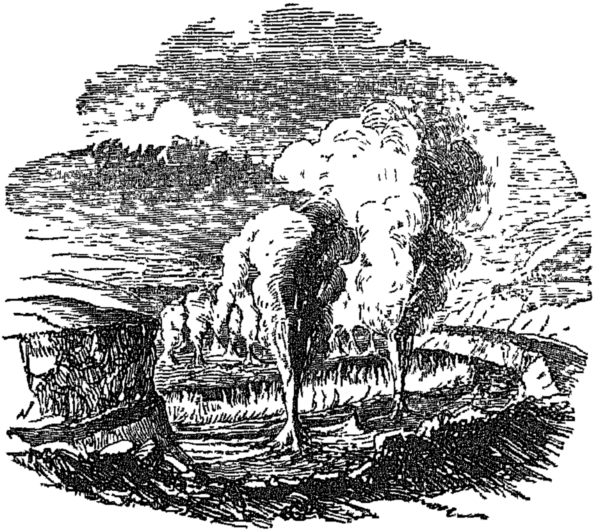
The belief which at that time prevailed in the guardianship of tutelary deities watching over the welfare of nations and cities, as well as individuals, very likely received a confirmation from the fate of Rhodes. From the time the statue of Apollo ceased to guard her harbour, it declined in power and importance, until it was subjugated by the Romans. The conquerors had but little regard for the statue—possibly they wished to destroy a memento of former greatness and independence, possibly some unsuccessful general coveted its value. It was taken down, broken up and sold, as before stated, to a Jewish merchant for £36,000—and the ruins were sufficient to load 900 camels. Rhodes never recovered its consideration. It remained for a long time dependent upon Rome. When the Roman Empire was destroyed, the Saracens seized upon it as their spoil, and it passed through various stages of decay. Now it is a quiet island, and the centre of some of the local commerce of the Archipelago.

THE VOLCANO OF KIRAUEA.

THE group known as the Sandwich Islands, is situated in the tropic of Cancer, and extends in north latitude from 18 deg: 50 min: to 22 deg: 20 min: and in west longitude from 154 deg: 53 min: to 160 deg: 13 min. The islands are ten in number, and were discovered by the celebrated Captain Cook in the 17th century. The principal is that of Hawaii, a name corrupted into that of Owhyhee, and chiefly known as the place where Captain Cook was killed. Hawaii is estimated to be 280 miles in circumference, and from it rise the three high mountains Manna Kea, Manna Roa, and Kiraucea. The elevation of these is variously computed—Captain King gave as their approximate height, 16,000 or 18,000 feet, but that was a mere guess, while Captain Beechby, who made accurate sextant measurements, and is therefore more to be depended on, computed the highest point to be about 7000 feet.

There can be little doubt that the Sandwich Islands owe their existence to two causes—the efforts of one of the most minute powers in nature, the coral insect, and the convulsions of vast volcanoes burning far below the surface of the sea. The first is proved by the coral specimens which are found—the second by the general nature of the land which every where bears traces of its origin, and the immense volcanoes which are still active. Year by year, and century by century, the little worms working over the fierce subterranean fires, which appear to spread over the base of the whole group, went on patiently toiling at their labours—generation by generation they added some imperceptible increase to the superstructure, and dying piled upon it their remains, till at last the long pent-up fires bursting through all control, rushed forth with ungovernable fury, driving back the ocean's waves—vomiting forth hissing and roaring torrents of molten lava, and with earthquake throes, cast up into the sunshine the surface which was to become the habitation of man.

The inhabitants of those islands have been so often described, that we need only glance at their personal appearance and customs. They are a fine dark race, with long hair of a black or brown color—sometimes slightly curled, and many of them have beautiful features. Tall and well-proportioned in figure, they are active, strong, and capable of great endurances. Both the sexes, however, make themselves hideous by the practice of tattooing, which is performed by scratching lines upon the skin with a comb-like instrument, and applying to the wound herbs which cause the scars to become permanent. When first discovered their manners were simple, and their food consisted chiefly of yams, bread-fruit, cocoa-nuts, and plantains, but since then, Europeans have introduced cattle, sheep and goats to the islands which, with the exception of rats and birds, were before destitute of other inhabitants than man. They are represented as mild, affectionate and obliging to strangers, notwithstanding the slaughter of Captain Cook, that unfortunate occurrence being attributed to some misconception of his motives, leading to a sudden burst of passion, under the influence of which the outrage was perpetrated. The government was vested in a chief, assisted and often controlled by the priests of the native religion, which was paganism in one of its most repulsive forms, embodying the worship of a plurality of grotesque deities ; but by the efforts of missionaries, Christianity has been substituted. Like all semi-barbarous people, however, their conversion is far from perfect, and they still retain a great many of their old superstitions. An instance was given of this some few years ago, when an eruption took place from a large crater, The lava rushed along in broad streams of liquid fire, burning all down that opposed its



passage. Houses, trees, rocks, walls, were surrounded and carried away. Terror and consternation spread upon every side—the people forgetting their Christianity, appealed to their old gods to stay the ravages which were being committed, and sacrificing their hogs threw them as peace-offerings into the fiery stream. All was ineffectual, and the king, chiefs, and priests assembled in solemn council to debate what was best to be done. What follows, strongly reminds us of a passage in the history of Rome. When a gulf opened there threatening to swallow that city, it was declared that it would only be closed by a sacrifice of the most precious nature, and a devoted warrior threw himself into the chasm which closed upon him and disappeared. The council came to a similar conclusion—but instead of sacrificing life, the king cut off his own hair, supposed to be the most valuable of offerings, and in solemn procession threw it into the torrent. The flow of the lava stopped, though not till a day or two afterwards, and the people supposed that the offended gods were appeased. For a long time remnants of the olden faith will cling to the minds of a half-civilized people, but commerce with the rest of the world, and the continued spread and strengthening of purer doctrines will at length make them forgotten. As a rendevous for whalers and a depot for merchandise, the islands are now growing into some importance, and it is said that the Republic of the United States regards them as a future valuable acquisition. The recent gold discoveries in California have attracted crowds of the islanders to the region of gold, where they may be seen working side by side with the patient Chinese, examples of the oldest and the youngest of the tribes which people the earth.

The interior of Hawaii is as yet but little known. Near the coast the land is fertile, the cocoa-nut trees and the sugar-canes growing to an immense size The general surface is clothed with the richest verdure, except where recent eruptions have taken place. On the mountains a stratum of fossil coral is found, and the shores are surrounded by white coral, and in many parts the steep and rugged highlands are covered with volcanic rocks and indurated lava, and dotted with extinct volcanoes. The mountain of Kirauea, about twenty miles from the sea, contains the volcano of that name, the largest, not only in Hawaii, but in the known world. The approach to it for many miles is through woods, dense thickets, and growths of reeds and fern, but nearer to its base, is a dark, parched sandy waste, about four miles in extent, bordered by a broad track of old lava, with a surface of glass-like brilliancy. The appearance of this is singular. It is tossed into wild, irregular and billowy forms, like waves lashed by the wind, as though when it was in a state of the greatest agitation, it had been suddenly arrested, hushed into rest and petrified without change of form. Passing over this by the only path which leads to the summit of the mountain, the smoke and steamy vapour mingled with the fumes of sulphur, shewed that the volcano is near at hand.

It is hardly possible to imagine the sight which bursts upon the explorer from the edge of the crater. By the side of this all the volcanoes of Europe dwindle into insignificance. Down a steep precipice sunk to a depth varying from two to four hundred feet, is a vast amphitheatre of five or six miles in diameter. On the surface of this there are hills of lava—large rock-like scoriæ and piles of ashes, sulphur and salt—intermingled with burning lakes tossing to and fro in waves of fire and spray of flame. Fifty-one conical islands, each containing a crater, have been counted, twenty-two of which were in an active state of eruption, masses of grey smoke curling from their orifices, lighted up by cones of red flame, while fountains of lava played into the air and rolled back burning streams to mingle in the ignited lake below. In some places ashes and stones were hurled up, as though from a powerful engine, recalling to the classic mind the wars of of the Titans against the Gods, and the whole was accompanied with a roar like that of a thousand engines in motion, and the hiss of burning spray as it leaped up in foam from thirty to fifty feet in height. It would be worth a journey round the world to contemplate such a scene, which for majestic grandeur and awful sublimity, is without a parallel.

In 1825 Mr. Stewart, and a party from the Blonde Frigate, effected a descent into the crater. As they advanced towards the edge, the mountain cliffs became more rugged and perpendicular, till at length they assumed the appearance of a bare wall, nearly thirty feet high. Projecting rocks, seemed suspended as loosely as though they had been suddenly arrested in their fall by some invisible hand, and were only pausing for a moment, till released, to renew their downward course. From the sides and top, in many places, mists of white vapour rose, and here and there streams of hardened lava looked as though they had burst burning over on the summit, and cooled before they reached the bottom; like icicles frozen, while in the act of dropping. At about two miles inward from the ledge, Mr. Stewart and his companions came to a spot where, instead of the precipice continuing perpendicular, it sloped downwards over confused masses of rock and lava, as though a mountain had fallen to ruin and broken down in some convulsion of nature. This was the place at which they were told it was possible to make a descent; but they were without a guide, and ignorant of the course to take. They met a party who had been down, and were anxiously counselled by them not to make the attempt without proper assistance. To this they turned a deaf ear. They had come out to see the volcano, and emboldened by the knowledge that the path had been recently trodden by others with sailor-like recklessness, on they went. The descent was difficult—a perilous one—and only to be accomplished safely by great caution and vigor. Struggling with hands and feet, never leaving one *resting place till they made sure the other was secure, twenty* minutes of toil brought them to the bottom, with no worse injuries than scratches from the sharp rocks; and then the sight amply rewarded them for all their danger and labour. We must let Mr. Stewart give the description in his own words.

"Rough and distorted was the black mass under our feet; innumerable rocks, fissures, deep chasms, and holes from which sulphurous vapour, steam, and smoke, were exhaled with a degree of heat that fully testified the near vicinity of fire. We had not proceeded far before our path was intersected by a chasm, thirty feet wide, and of greater depth than we could ascertain at the nearest distance we dare approach. At no considerable distance from us was one of the largest conical craters, whose laborious action had so greatly impressed our minds during the night. On reaching its base, we judged it to be 150 feet high; a huge inverted funnel of lava, with clefts, orifices, and funnels, from which bodies of flame escaped; while red flames, ashes, and stones, were propelled with equal force from its rugged mouth. Lord Byron, one of the party, ascended the cone several feet, but found the heat too great to remain longer, than to detach, with a stick, a piece or two of lava, burning hot. So great was our admiration, that we forgot the imminent danger of our situation arising from the sulphurous air by which we might be surrounded. On reaching our hut we had cause for congratulation, for, on turning round, the whole chasm was filled with a sulphurous smoke, and within half an hour was completely choked with it. At night splendid illuminations were lighted up, the volcano began roaring and labouring with redoubled activity. The confusion of noises was prodigiously great—not fixed, nor confined to one place, but rolling from one end of the crater to the other, sometimes seeming to be immediately beneath us, where a sensible tremor of the ground took place; and then again rushing to the furthest end with incalculable velocity. The whole air was filled with the tumult, and those most soundly asleep were quickly aroused by it to a thorough wakefulness. Byron sprung up in his cot exclaiming, 'we shall certainly have an eruption; such power must certainly break through everything!' He had scarcely ceased speaking when a heavy column of dense black smoke was seen rising from the crater directly in front of us; the subterranean struggle ceased, and immediately after flames burst from a large cone, near which we had been in the morning, and which had appeared long inactive. Red hot stones, cinders, and ashes, were also propelled to a great height with immense violence; and shortly after the molten lava came boiling up, and flowed down the sides of the cone, and over the surrounding scoriæ in two beautiful streams glittering with indescribable brilliance.

"At the same time a whole lake of fire opened in a more distant part—this could not have been less than two miles in circumference, and its action was more horribly sublime than anything I have imagined to exist, even in the ideal visions of unearthly things. Its surface had all the agitation of an ocean; billow upon billow tossed its monstrous bosom in the air, and occasionally those from opposite directions burst with such violence as to dash the foaming fire perhaps fifty feet in the air."

What beside its immense size and terrific phenomena distinguishes this crater from all others, is its hard crust above a plain of fiery lava. This crust cracking in many places, and subsiding forms heights and hollows all over the surface. Immense as it is, how small must it be in comparison with that gigantic subterranean fire which upheaved the island, and probably burns beneath the whole area of Hawaii extending over 4,000 square miles. The island itself, everywhere perforated with craters, "forms a hollow cone over one vast furnace, situate in the heart of a stupendous sub-marine mountain, rising from the bottom of the sea."

ORGANS.

OF all the musical instruments yet invented, the Organ is at once the most grand, solemn, and powerful. This makes it peculiarly fitted for devotional purposes, and when its full swell is heard reverbrating below the spacious dome, or through the groined arches of some old cathedral, a sensation of humility and awe steals over the listener, which impels to worship and adoration.

The Organ is an instrument of the greatest antiquity—We have no authentic record of the time it was first brought into action, but probably it was known to the Jews, and certainly to the Greeks, from whom the Romans, who borrowed much of their art, took it. Some of the Organs of ancient times must have been of immense power, even allowing for the exaggeration which history accumulates around it with the lapse of time. St. Jerome tells us of one existing in his time, the sound of which could be heard at the distance of a mile, and it is said that another at Jerusalem made itself audible as far as the Mount of Olives.

The introduction of Organs into the cold, barbarous and less musical north, was of more recent date, and we owe them, with many other things, to the Church. The religion which touched our forefathers, was one which was mingled largely with sense and passion, and came through the avenue of the feelings, rather than by the action of reason. They required solemnity to be invested with splendour, sublimity, and power, before it impressed itself upon their minds. They worshipped in the midst of spectacles and processions, and were stimulated to zeal by the incense and the music. Probably, after its earliest ages, when faith prompted devotion, and braved every danger, the progress of Christianity was in a great measure due to the ceremonies by which it was accompanied, and the splendid gothic cathedrals in which it was practiced. Knowledge, and perhaps more than knowledge, that condition of mind which is known as "sharpness" has made us doubting, cold and unimpressible, but from the effect upon our own minds, we can imagine the ignorant, simple serf, or the rough, untaught, vassal soldier, standing beneath the vaulted roof, surrounded by pillars of quaint and beautiful forms, over which the mellowed light admitted through the richly stained windows, played with a subdued glow, and listening to the organ's notes, and the measured chant of the choristers. Contrasting the scene with the wretched hut, or the rough guard room—the splendour with his squalor, he would find nothing in his experience to compare with it, except perhaps, the arched avenues of the forest filled with feathery songsters, and pervaded by the low hum of the woods, and he might well deem the rites there practiced, those which were sanctioned on high, and while he bent his stalwart knee and rough mind before the altar, believe that he was raised into the presence of that eternal power which invisibly pervaded his being, and controlled the destinies of all around.

Bellarmine asserts that Organs were used in European churches as early as the year 660, but there is some doubt as to the accuracy of this statement, for the first dependable mention of such an occurrence is a century later in the year 757. The instrument in that case, was not of Northern manufacture, but was a present from the Emperor Constantine, surnamed Copronymus to

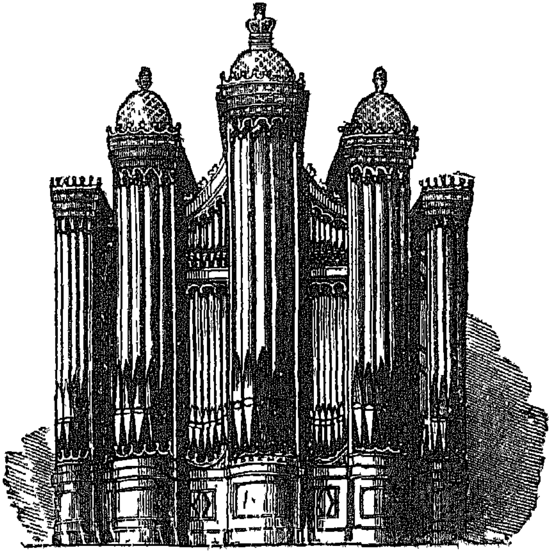
Pepin of France. The French writers of that period, describe it as a musical machine having pipes of tin. This is most likely a mistake, a mixed metal resembling tin in colour, being probably the one used. Of its excellence we have not any means of judging, but contemporary historians remark, that it had a great variety of tones alternating between the roaring of thunder and the warbling of a song-bird.

It is certain, that Organs in England were introduced at a much later period—but as to the exact date accounts are somewhat contradictory. Bingham states that they were introduced in the time of Thomas Aquinas, A.D. 1250, but Gervase the Canterbury monk, who lived about the year 1200, asserts that they were in use 100 years before his time, and from his statement it may be inferred, that they became common about the eleventh century. From that era up to the time of the Reformation, as the power and wealth of the church increased, and the bequests of pious devotees multiplied, they became more common with other appliances of art, used to increase the effect of divine worship, but the religious troubles of that period—the humiliation of the ecclesiastical power by Henry VIII, and the spoilation of church property, prevented their number being added to. The unsettled character of the short reign of Edward VI.—the gloom and persecution of that of Mary, the Protestantism of Elizabeth and James, and the civil wars of Charles I. had the same effect, and the ascetic rigor and stern simplicity of the puritan era, and the Commonwealth, was still more effectual in preventing improvement.

From the early part of the reign of Henry VIII. to the Restoration of Charles II., little or nothing was done in this country towards improving this noble instrument, but the reign of the "Merry Monarch" introduced another state of things. Charles, though profligate, had a temperament which might have led to the extreme of bigotry and fanaticism. If he had thought deeply he would probably have been an enthusiastic religionist. There was something in the blood of the Stuart dynasty which ever impelled that family to extremes of conduct. They were mostly capable either of greatness or littleness. The secret of Charles's disposition is to be found not so much in the inability to think, as the avoidance of all thought. He was careless quite as much as bad. As it was he occasionally manifested strong devotional tendencies by fits and starts, and the sensuousness of his nature naturally inclined him to that place of worship which struck upon the feelings. He seems to have encouraged and lent his aid to the practice of organ building. By this time however, disuse had left but few workmen fit for the purpose and foreign artizans were sought for in order to make up for the lack of native skill. Among the first who came over was one Bernard Schmidt, or as the name afterwards became anglicised Smith. accompanied by his two nephews Gerard and Bernard, and between these and Dallans the most prominent English organ builder then established, a fierce rivalry was waged. Harris, a Frenchman with his son Renatus, afterwards arrived, but did not at first attract much notice—Smith and Dallans sharing popularity and custom between them. One of the first works which Smith performed was the building of an organ for the Royal Chapel at Whitehall, but perhaps owing to the haste with which he was required to finish it, it was by no means a good instrument.

In 1672 Dallans died, and then a contest for favour began between Smith and the younger Harris, who, with more talent and energy than his father, had by this time established a reputation, and out of this arose an incident which gave a great stimulus to organ building, and prompted improvements in the instrument. An organ was required for the beautiful church of the Temple, toward the termination of the reign of Charles II., and Smith and Harris both sought to be employed on a piece of work which promised so much reputation. One of the fiercest contests on record in the world of music ensued, and so nicely balanced were the claims of the candidates, that as the only means of settling the dispute it was determined that each should build an organ to be placed one at either end of the church, and that the best should have the preference. The instruments were built and then came the trial. No efforts were spared on either side to ensure success. Dr. Blow an eminent musician of that day, and Purcell so well known to musicians as one of the sweetest of our old English composers were engaged by Smith to bring out the tones of his organ to the best advantage—while Harris procured the services of Lally the organist of Queen Catherine Smith's organ first awoke the echoes of the church, and the delighted auditors thought that the German must needs be the victor, but when Harris's turn came the scales were so even that it was impossible to say which had the predominence. This battle of sweet sounds continued for twelve months, in the presence of the best judges of the time, victory sometimes inclining to one side and sometimes to the other. Each had its enthusiastic partizans and the war waged fiercer than ever. At length Harris challenged Smith to a further trial of skill in the construction of additional stops. Both of them added the stops known as the *vox humana*, the violin or cremona, and the flute stops, and the trial commenced afresh. Still they were both so equal that a decision was as far off as ever, and at last the puzzled jury selected an arbiter in the person of Judge Jeffries. The Judge awarded the palm to the organ built by Smith — Harris's was removed, and Smith's is that to the sounds of which the Templars still perform their devotions.

It is interesting to trace the fate of the rejected instrument—what became of it for some time we do not know, but in the reign of George II. it was purchased for Christ Church, Dublin. Being out of repair, Byfield, an organist of that day, was sent for to put it in order, and at his solicitation it was rejected again for a new organ built by himself, he taking the old one in part exchange. Byfield attempted to sell it for the church of Lynn, in Norfolk, but it met with a third rejection at the hands of the inhabitants of that parish, and remained unsold till after his death, when his widow disposed of it for use in a church at Wolverhampton, where it found a permanent resting place, and was said to be the best toned organ in England.



The eclat of the Temple contest causèd a great many organs to be built in London, and Harris though defeated, had the best of the market. Possibly he was a little cheaper as well as more enterprising than his older competitor. While Smith built the organ for St. Paul's Cathedral, Harris constructed those of St. Mary Axe, St. Bride, and St. Lawrence.

Most of those who take any interest in such matters are aware of the Haarlem Organ which was built by Muller in 1738. It has 60 stops, among which is the *vox humana*, and was long considered the noblest instrument of its kind. It seems, however, that its excellence in comparison with others, has been much exaggerated, and it is now said to want both variety of tone and power. The Organs of Seville, Tours, Goerlitz, Warigasten, Hamburgh and Merseburg, are all larger than that at Haarlam, and those of York and Birmingham are of greater size than any others. Dr. Burney, who was certainly a competent judge, was disappointed with the Haarlem Organ, a feeling which was heightened by the organist not being a good player, and the Dr. thus expresses his opinion:—"It has sixty stops; several of which are not known to our Organ builders, or to be found in any instrument in this country. There are two tremulants, two couplings or springs of communication, five separations or valves to close the wind chest of a whole set of keys in case of a "*cipher*," and twelve pairs of bellows. Upon the whole it is a noble instrument, though I think that of the new church at Hamburgh is larger, and that of the Old Kerk in Amsterdam better toned." Of the celebrated human voice stop, Dr. Gurney has a most contemptuous opinion, saying, "Of all stops I have yet heard, which have been honoured with the appellation of *vox humana*, no one, in the treble parts, has ever reminded me of anything human, so much as the cracked voice of an old woman of ninety; or in the lower parts, of Punch singing through a comb." The fact is, that though the organ, which produces notes by means more analagous than any other instrument to those which are employed to produce the voice of man, and approaches it more nearly, is incapable, as all man-made machines are, or probably ever will be, of rivalling in sweetness and flexibility, the voice which nature has bestowed upon the noblest inhabitant of the earth.

Among the largest Organs in the world, may be enumerated the following—That of Seville cathedral which has 100 stops and 5,300 pipes—Goerlitz in Upper Lusadia, 82 stops and 3,270 pipes—St. Michael's Hamburgh, 67 stops and 6666 pipes—Ulen, 45 stops and 3,442 pipes—St. John Lateran at Rome, 36 stops—Baltimore U.S. 36 stops and 2,213 pipes—Old York organ, 32 stops and 3,254 pipes. The ingenuity and thought shown by adapting these vast numbers of pipes conveying sound, and evolving and combining the tones, may well rank among the marvels of the world.

We have already mentioned that the modern Organs at Birmingham and York are larger and more powerful than any others Opinions are divided as to the comparative size and power of those grand musical machines, though the preference of connoisseurs rather leant to that of Birmingham. It must be mentioned however, that the latter derives a great advantage from its position. The York Organ in the cathedral has its sound interrupted by the pillars, arches, passages and other projections and irregularities of the building, while its Birmingham rival stands in the noble hall in which the Musical Festivals are held, and the chorusses at those famous entertainments are indebted to it for a great part of its attractiveness, This in the judgment of many, accounts for the apparent superiority it exhibits. The trombone stop is acknowledged to be the richest and mellowest of any in the world. We give an engraving of this magnificent instrument the dimensions of which are as follows: width 35 feet, height 45 feet, depth 15 feet. The timber used in its construction weighs alone twenty tons, and the metal brings the whole ponderous mass up to about forty tons. Without pretending to set a limit to human skill, we are inclined to think that in construction the organ is nearly as perfect as it can be. By the attainment of greater size the volume of tone may be increased without any new variations being introduced, and those who have compared the Temple Organ, constructed by the elder Smith in the reign of Charles II. with those at York and Birmingham, or the splendid ones which figured at the Exhibition of 1851, have seen that the difference in point of merit is so small, that considering the great time which has elapsed, we must expect improvement to proceed very slowly.

The organ can never become an instrument for the people, its size and the cost necessary to render it efficient will effectually prevent that. The rich may indulge themselves in minor ones, but those worth notice will be confined to churches and other public buildings, for which they are best fitted, but now that a love for music is growing among the people, we may, not inaptly, close this article with a hope that while the organ continues to harmonize with the tones of "loud voiced choristers," that truly domestic instrument the pianoforte, may be so cheapened, by divesting it of superfluities, and ornament, as to cause it to find a place in the cottage homes of England.

WHIRLPOOLS.

NEAR the coast of Norway, in about latitude 68, is a vast whirlpool, commonly called Maelstrom, of Moskoe-Strom, Its violence exceeds that of a cataract, being heard a great distance, without any intermission, except for a quarter of an hour, at the turn of high and low water, when its impetuosity seems at a stand; but this motion soon returns, and gradually increases with such a draught and vortex, as absorbs whatever comes within its sphere of action, keeping it for hours under water, when the fragments shivered by the rocks appear. Mr. Ramus observes, that at the time of flood, the streams run up the country, between the islands of Lofoden and Moskoe, with a boisterous rapidity; but the roar of its impetuous ebb to the sea, is scarcely equalled by the loudest cataracts, the noise being heard at the distance of several leagues. The whirlpool is then of such extent and depth, that if a ship comes within its attraction, it is inevitably absorbed, and dashed to pieces against the rocks at the bottom, But when the stream is most boisterous, and its fury heightened by a storm, it is dangerous to come within six English miles of it; ships, boats, and yachts, having been carried away by not guarding against it, before it was too late. It frequently happens that even whales, coming too near the stream, are overpowed by its violence; and then it is impossible to describe their bellowings in their fruitless struggles to disengage themselves. A bear once attempting to swim to the Island Moskoe, in order to prey on the sheep feeding on the island, afforded a similar spectacle: for the stream caught him, and bore him down, while he roared so terribly as to be heard on shore. It is remarkable that large firs and pine trees, after being absorbed by the current rise again with their trunks so broken and lacerated, that they seem as if covered with bristles

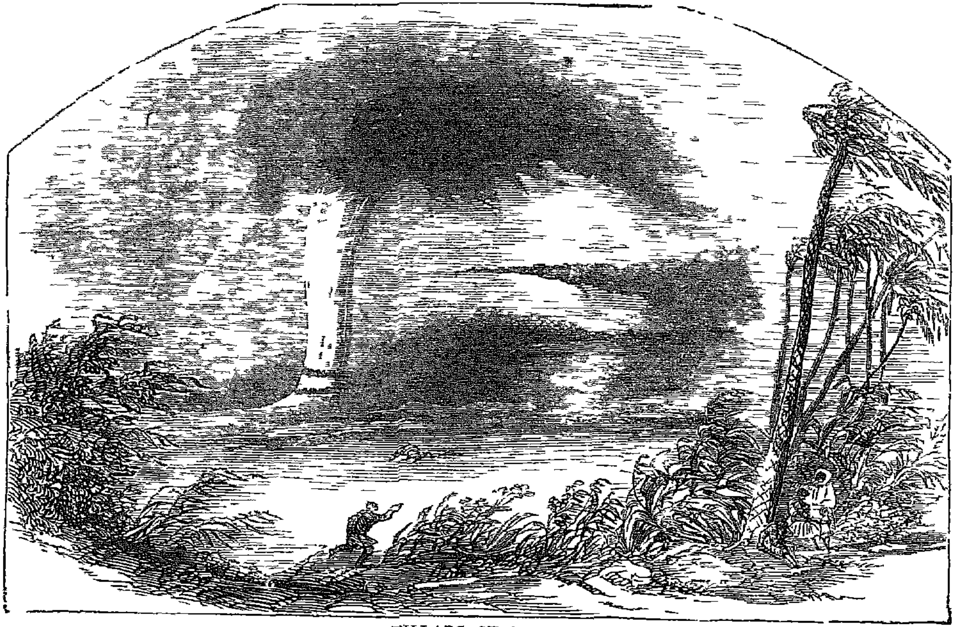
The account we have of the whirlpools about the islands of Ferro, given us by Mr. Jacobson Debes, provost of the churches is also very extraordinary. The most dangerous is that which lies south of Suderoe, near a rock called the Monk, where several vessels have been swallowed up. The sea round this whirlpool is eighty or ninety fathoms deep, and the surface of the water smooth and serene; but a little farther in, the ground lies at the depth of twenty-five or thirty fathoms, where the sea begins to rise and turn round. Within this the ground lies from eight to ten or twelve fathoms deep, in four circles; and rises up in points or cliffs; which are about eight fathoms under water, and about twelve distant from each other.

PILLARS OF SAND.

AMONG the many wonderful phenomena of the desert there are none more astonishing or capable of exciting mingled feelings of awe and admiration than one recorded by Bruce the traveller. He, with his attendants, was resting among some acacia trees, near Waadiat Halhout, when their attention was attracted to some moving forms in the immense range of desert stretching away to the west and north-west. Upon particularly noticing them, Bruce perceived a vast number of pillars of sand, moving about with prodigious velocity. At first these were at some distance, but they rapidly approached toward the party, and gave Bruce a better opportunity of observing their dimensions. The largest was a column of about ten feet in diameter, and the tops reached into the clouds. There, sometimes, the head would break off, as it were, and the atoms of which it was composed fell, and dispersed in a dust-shower in the air; at others they would snap in the middle, as though a cannon-ball had been fired into them, and fall in a heap, marking the spot with mounds of sand.

A strong wind from the north was blowing, and these sand-giants rushed on as though to overwhelm the party. So near did they come in their terrific charge that the scattered particles fell upon Bruce, and he almost gave himself up for lost, when the wind changed to the south-east, and the masses retired into the bosom of the desert. Bruce tells us that the impression left upon his mind by this spectacle was one of mingled admiration and fear,—admiration at the wonder of the sight, and fear for the danger with which he was threatened. At one time the columns were within two miles of him, advancing with bird-like rapidity, and had not the wind veered round as it did, a few more minutes would have ended his fate. He felt as men of great nerve often do, paralysed in the presence of a danger so vast that it made all idea of resistance ridiculous. Even had he possessed energy enough for flight, no speed he could have exerted would have saved him. The swiftest horse would have been overtaken in a few minutes, and, together with his rider, overwhelmed in an impenetrable cloud, the atmosphere of which it would have been death to breathe.

This was not the last time Bruce witnessed this phenomenon. On a subsequent day, travelling along the edge of the same desert, he saw a great number of these sand-pillars; indeed, they were so numerous, as to bear the appearance of a forest



PILLARS OF SAND.

of colossal tree-trunks, destitute of either branches or foliage. These seemed to attend upon the course of the travellers, nearly keeping pace with them in their march, sometimes approaching to within a very short distance, and then whirling away to comparative remoteness. The most extraordinary sight was presented when the rays of the sun, striking full upon the pillars, glanced from them reflected in bright rays, and making them look like vast columns of fire. Bruce, forgetting his fears, and losing all sense of the pain under which he was at the time suffering, stood transfixed with wonder and admiration at the majestic and terrible beauty of the scene. Onward rolled the tall columns, turning on their axes as though impelled by a whirlwind--crossing and passing each other, as though in the mazes of some colossal dance. Now dashing onward as if in a fiery race, and again sweeping forward with slow and solemn movement—then standing comparatively still, and looking as if the desert was the floor of some immeasurable hall, the roof the cloudless sky, the sun the single lamp, and the sand-pillars the columns, which, reaching from floor to roof, supported the overarching dome. . . The sensation felt by Bruce, which, for its grandeur and the thrill of awe pervading it might almost be called delight, was not shared in by his attendants. The superstitious Greek who accompanied him, shrieked out that the Day of Judgment had come, and could not control his terror. Ismael, the fatalistic Mahomedan, calmer in his belief in destiny, gave it as his opinion, that it was the infernal regions; and the natives were impressed with the idea that it was a vast conflagration which would destroy the world. What it really did presage was the coming of the Simoon, that fearful wind upon the wings of which rides the Angel of Death, and which thus sent before it its sand-built messengers to herald its advent.

It is more than probable that in these sand-pillars of the desert we have one of the causes which produced the destruction of the ancient magnificence of the cities of Assyria. Discoverers, searching among the desert wastes of to-day for the remnants of past civilization, disinter, as from the grave, the ruins of old palaces, and come upon street and square, statue and fountain, temple and monument, which tell them that there, where the wandering Arab pitches his tent of camel hair, where the midnight hyenas howl, and the vulture swoops down from on high on the corpse of man or beast, which has fallen in that arid solitude; that there, where now is the aspect of desolation, long ages ago a race lived—solved the problems of science, and attained to great eminence in art, and then perished from the earth, leaving no word or memorial behind them—their very gods forgotten even in name—except those stones from which laborious hands have dug fathoms of sepulchral sand. It is possible, more than possible, that no human foe broke down their walls and spread death around; but that in the deep night, when all was still—in those silent hours when nature sleeps—at a time when danger was unthought of, and all seemed safety and peace; that then the desert wind reared up its armies of sand—countless pillars, taller than the tallest of the sons of man—their tops reaching to the heavens, and that borne by the breeze, they came on with a low rustling sound, heard, perhaps, by some solitary watcher, and the next moment all was ruin and death.

Another reminiscence we gather from sacred history. When Bruce tells us that the sand-pillars assumed the appearance of pillars of fire, that portion of the book of Exodus is recalled to mind, which relates how the chosen people, after their flight from Egypt, and in their passage through the wilderness, were led on by a pillar, now of fire now of cloud. We would not willingly incur the suspicion of dealing lightly with sacred subjects, or rashly interpret into anything approaching to natural fact, the working of Omnipotence, but the idea does arise involuntarily in the mind—an idea worthy the attention of commentators, that when Bruce looked on those fiery pillars, reaching up from sand to sky, he looked upon the likeness of that which stood before the children of Israel, the sign that the Being who had led them safely through the depths of the sea, continued to guide and protect them in their pilgrimage through the trackless desert.

CHAMPAGNE CELLARS AT EPERNEY.

THE cellars are entered by a flight of steps cut in the chalk rock. They are extremely vast, extending a mile under the hill, and ramifying into endless labyrinthine passages, lined by vinous walls. They always contain several millions of bottles; and it was curious to contemplate the huge army of long-necked flasks, with their shining silver helmets, each containing a valiant devil, and to think of the dreadful havoc that they would make some day, scattering the brains and good resolutions of man and womankind to the winds; that is, presuming they do not come to a premature and inglorious end, "wasting their sweetness" not on the "desert air," but in the humid caverns where they are tenderly laid side by side. Unlike his Lusitanian brother, who mellows by age, becoming softer and milder as time clothes him with a venerable beard, the native of glorious Champagne, frequently disdains to have his fizzing spirit pent up within the narrow confines of a bottle, and refusing to bide his time, which might have in store for him the enviable destiny of being pressed by the lips of a blushing ball-room belle, he bursts his crystal prison, and sighs his last on the ground of his dreary vault. And it is worthy of note, that as all great deeds are immediately imitated, the example set by a rebellious and hasty champagne flask is by no means lost on the multitudinous tribe that lie around. Pop—pop—fizz—fizz—splash—pop—crash—bang; you would imagine all the devils in the cauldron of the French *republique sociale* of A.D. 18— I leave your readers to add the figures—were let loose; and believe me no revolution could strike greater terror in the hearts of Messrs. Moet and Chandon than this rebellion among their bottles. Troops of men, clothed in defensive armour are sent down to the infernal regions to quell the insurrection. I am only stating the truth. For, when the explosions are frequent, and the breakage abundant, the workmen who are despatched to suppress the disturbance, wear wire masks to protect themselves from the broken glass which is projected shell fashion with considerable force. So disastrous are these explosions, that I was informed on one memorable occasion upwards of five hundred thousand bottles were lost before a sufficient quantity of ice could be thrown into the cellars, to lower the high temperature, which caused excessive fermentation. In all years a certain loss arises from the latter cause, although the greatest care is taken to reject all bottles which are not strong and of uniform thickness. The estimated average of loss from breakage is twenty per cent.; it varies, however, according to the temperature of the seasons from five to forty. All the manufacturing operations are carried on in the absence of daylight. The operators may be more aptly taken for Pluto's workmen than for those of the rosy god of wine. Like miners, they carry a candle with them, and by its light perform their work. Daylight is nowhere admitted to the vaults.—*Lit. Gazette.*

ST. PETERSBURGH.

THE city of St. Petersburgh is essentially a wonderful city—wonderful in origin, history, and modern greatness. It has risen from a lonely and pestiferous marsh, and exhibits in the history of its rise and progress the wonderful achievements of which man is capable when brought into antagonism with circumstances adverse to his will. Not that the rise of St. Petersburgh from a poisonous swamp to a thriving city, is wonder-fraught with pleasing traits; far otherwise, the story of this city's growth is a story of despotism and cruel tyranny, such as makes us blush for the ill-earned glories of one of the heroes of the world.

Previous to the middle of the fifteenth century, Russia was scarcely known to the nations of the world. In the year 1475 the Venetian ambassador found at Georgia an Italian agent from the grand duke of Muscovy, Ivan the Great, and the conquest of the Tartar kingdom of Astracan in 1553, by Ivan the Terrible, and the discovery of Siberia, a few years later, brought the Russians into closer relationship with the people of Asia than with those of the rest of Europe. Russia at this period was a sort of frozen Golgotha, a dreary desolate region, where nature denied man the luxurious resources of more southern climes, and where men denied themselves the blessings of peace and industry which were within their reach, and engaged in the turmoils of civil war and wholesale butchery; forgetting, amid furious struggles for power, and cruelties which would degrade the most savage people, the few elements of civilization which they might happen to possess. In the midst of these civil and social convulsions Peter the Great was reared. He was born on the 11th of June, 1672, was son of Alexis Michaelowitz, czar of Russia; his mother being Natalia Caralowna Naraskine, second wife of the emperor Alexis.

Peter the Great was a man of strong mind, and set his whole heart on imperial ambition. Stooping from his high station as an imperial prince, in order the more fully to realize a future greatness, he left the royal household, the court and national council, and came to England, where in the dockyard of Deptford he laboured with his own hands in the craft of ship building, the meanwhile watching with the keen eye of a master artificer every process of that art for which the English had earned so noble a fame. Thus he became possessed of some of the essential qualities of a prince—a practical knowledge of these mechanical arts most closely connected with national enterprise.

ORIGIN OF THE CITY.

Returning to his country and assuming imperial sway, it became the Czar's object to render Russia a great maritime and commercial power, and to this end he conceived the idea of founding a new capital; Moscow, as a centre of trade and government, being ill-suited, by its inland position, to the furtherance of his design. The spot chosen by him was a low fenny island, formed by the branches of the river Neva before it falls into the Gulf of Finland. In the winter, this island was covered with ice, in the summer with mud, which sent up pestiferous exhalations, while the forests around were the haunts of savage animals.

But these were not impediments sufficient to daunt a man whose whole character was an embodied barbarity, and in the way of whose will not even human life dare stand; so despotic, cruel, and tyrannous was his nature. Voltaire, by his eloquent panegyric, has lent an *eclat* to the acts of Peter's life, whom he describes as leaving his kingdom "for the sole purpose of learning the art of government," but who never acquired the knowledge for which he set out. Little indeed had the monarch profited by the example of civilized communities, when on his return from his long sojourn in Holland and England, "*with the wine-cup in one hand, and the axe in the* other, he drank off twenty successive draughts, and smote off twenty successive heads within the hour." Indeed, contempt for human life was one of Peter's characteristics, and so having chosen a spot, he determined that a city should be built; and the crowning act of his life was thus accomplished in the founding of St. Petersburgh.

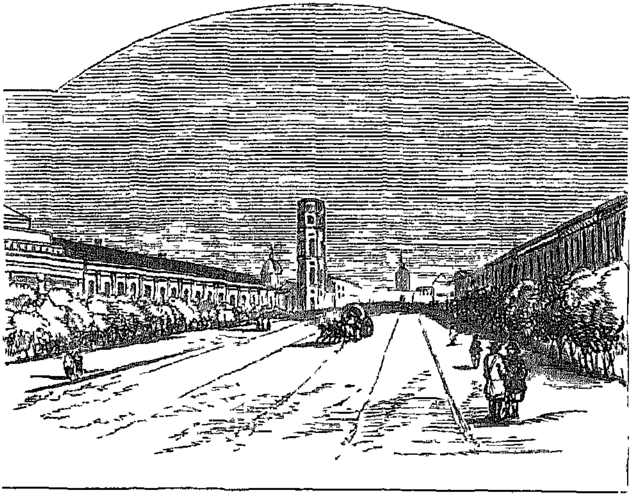
"Here," says Mr. Fowler, in his recent work on the Sovereigns of Russia, "he concentrated all his mighty powers, in contempt of the opinions of others, and seemingly in contempt of Nature herself; the Boyars urged their objections to the barren and swampy soil, at the extremity of the Gulf of Finland. Opposite are three islands, formed by the Neva, which were formerly occupied by a few fishermen's huts. These islands are now crowded with public buildings and large establishments. To effect this great work, forests were broken through, morasses dried up, and banks raised before the new city could be built; and it is computed that not less than ten thousand men perished in the morasses during these operations where they could neither find food to eat nor shelter to cover them. They were pressed to the work from all parts of the empire, even from Astracan and Kasan. More than forty thousand men were employed, consisting of Cossacs, Kalmucs, and Russian peasants. Their number was successively augmented by the prisoners of war, whom Peter turned to good account, not following the example of his rival Charles, who put many of his prisoners to death. More than forty thousand men were here employed, and, in the short space of five months, the fortress was completed, the plan of which the Czar drew with his own hand, and under every difficulty of want of tools. For wheel-barrows they substituted bags, or their shirts, in which to carry the earth; thus out of the midst of an almost inaccessible marsh sprang this fortress, surrounded with a wall of earth, having doors, and six bastions, defended by three hundred pieces of cannon. * * The opposition to building the new city was so great, that none but the most despotic measures could have enabled Peter to carry it into effect. The people regarded it with terror, from the great mortality which it had already occasioned; they broke out in loud complaints of the Czar's long absence from Moscow, and with the greatest difficulty did he induce the inhabitants to emigrate from thence to the bleak and dismal islands of the Neva."

In this way, in little more than a year, upwards of thirty thousand houses were erected, and inhabitants were invited from all parts of Europe to people it: a thousand families were removed from Moscow, and the nobility were compelled, under heavy penalties, to erect palaces in the new capital, which was finished in the year 1703.

But though despotic power could thus change a wild and woody morass into a splendid city, it could not entirely conquer the disadvantages of nature. From its low situation it is liable to inundations of the river Neva, which frequently do incredible damage, carrying away the cottages of the peasants in the vicinity of the city, together with the farming stock and implements of husbandry.

This inconvenience could not be averted nor remedied; the only thing that remained, therefore, was to institute some religious ceremony which, by its imposing effect on the senses, might inspire the people with confidence in its efficiency, and render them less apprehensive of the frequent recurrence of the danger. Accordingly, on the 17th of January, a grand ceremony, called the "Benediction of the Neva," took place, at which a countryman of ours, Dr. Clarke, was present.

The career of Peter was closed by an event which appeared like Divine retribution for his cruelty in the erection of the city. In the year 1725 he was present at the annual benediction of the Neva, and having already a slight indisposition, the exposure on the ice increased his disorder, and he died soon afterwards, at the age of fifty-three.



ASPECT OF THE CITY.

Spite of the repeated inundations of the Neva, St. Petersburgh still stands, a memento of what man may accomplish in his battle with the elements, and, forgetting, in this view of its history, the horrible associations of its first foundation, it is truly a city of wonders. By an ukase, which transferred the trade from Archangel to the new city, its prosperity was much advanced, though the former city was ruined for the advantage of the latter. In general aspect St. Petersburgh is an imposing place, and bears all the impress of imperial favour and commercial prosperity. The streets are regular and wide, and three of the principal ones, which meet at the Admiralty, are at least *two miles in length*; the mansions of the nobility are sumptuous and spacious structures, and the imperial winter palace is of colossal dimensions, being five hundred feet in length, and three hundred and fifty in breadth; surrounded on all sides by architectural magnificence and princely display.

In the same quarter with the winter palace, are the gardens which belonged to the summer palace, which has recently been taken down. These are laid out with every auxiliary for sumptuous elegance and magnificent effect, and are adorned with a profusion of statues and fountains, which render their splendour still more complete. To these gardens the public have free access.

The churches of St. Petersburgh are many of them very fine. That of St. Isaac was commenced by the empress Catherine, and intended by her to be the most elegant in the city. It is erected on a basement of granite; the superstructure, both within and without, is of marble, jasper, and porphyry. The completion of the edifice was effected after the death of the empress by her successor, who used so ignoble a material as brick for the purpose.

Of bridges, St. Petersburgh has none of any note. A suspension-bridge now in course of erection, may retrieve the character of the city in this respect, but the building of a permanent stone bridge is a thing impossible, owing to the frequent inundations of the river. In 1715, the bastions and drawbridges were overwhelmed or carried away, and similar mischief occurred only six years ago. The breadth of the river, the rapidity of the stream, and the inundations, prevent the erection of permanent bridges of any kind.

Many of the public buildings of St. Petersburgh are very fine as works of art. The Bank and the Arsenal, are both noble structures, and several of the convents, which abound in the city, are worthy of admiration as specimens of architecture.

There are two objects of interest, however, which merit attention as national and historical monuments: one is the Hut of Peter the Great, the other the colossal statue of the same personage.

THE HUT OF PETER THE GREAT

Was inhabited by him during the period he was occupied in building the city. It is on one of the islands known as Petersburgh quarter, and is a small wooden cottage, preserved and protected with a sort of religious care. Round it a structure of brick has been erected on arches, to defend the frail tenement from the attacks of the weather. On the other islands several forest-trees are still standing; and one is highly embellished by art, and laid out in walks, parterres, and avenues, with plantations and shrubberies. On the island in the Neva is the citadel, a strong fortress, which serves likewise as a state prison. This fortress has two gates, the access to one of which is over a drawbridge, and the other by water only. Within the citadel is the church of St. Peter and St. Paul, in which the remains of its founder Peter I. repose. Here also are the gold and silver assay offices, and the Royal Mint.

THE STATUE OF PETER THE GREAT

Is a colossal work and justly held in esteem as one of the wonders of the world. The magnitude, the boldness of its conception and execution, and its imposing grandeur as a monument, justly entitle it to rank with the highest achievements of monumental art. *The statue is equestrian. Peter, seated on a* charger, is climbing a rocky height, and his horse, rearing on its hind legs, in a spirited attitude, on the edge of an immense rock, conveys an idea of conscious power and self-reliance such as matches well with the renowned fame of the Czar. The steep ascent up which the horse is climbing with startling muscular energy and fiery expression of eager courage, represents the difficulty which Peter had to encounter in setting forth on his enterprise; and the coiled serpent, which the horse crushes beneath its feet, still more strikingly betokens the dangers he encountered and subdued. The expression of the Czar, as he sits in composed tranquillity, finely intimates with what coolness he contemplated, and with what firmness he overcame, the most formidable obstacles. The statue of the Czar is eleven feet high, and that of the horse seventeen. The rock which forms the pedestal was brought from Finland, at an expense of 70,000 rubles. The entire expense of the monument was 424,610 rubles.

St. Petersburgh has a very extensive commerce, which chiefly arises from its being the seat of the sovereign, and from foreigners having the same privileges as the natives; and all religions are tolerated. The merchants settled here are chiefly foreigners, many of whom are English. The number of Russian merchants trading outwards is very small; and they are for the most part very ignorant. In no place is so much experience requisite for a merchant as at St. Petersburgh; for he must know the people before he deals with them: he must be acquainted with the different forms and obligations of contracts, the various manners of payment, the many formalities called justice, the various occasions and manners in which he may be cheated without redress, the different explanations that the tariff admits of, the monopolies, privileges of the crown; prohibitions of exports and imports (changed sometimes as soon as issued); in short, all the numerous difficulties and shackles imposed on the empire. Its principal exports are hemp, flax, iron, leather, furs, and tallow. The principal imports are coffee, sugar, indigo, dye-woods, spices, cotton twist, salt, &c. Refined sugars are prohibited; the importation of hardware, earthenware, and manufactured goods, is occasionally prohibited. The inhabitants, also, carry on a very considerable trade by land with the Chinese and Persians. Their chief manufactures consist of woollen and linen, paper and powder. Here are also yards for making ropes, cables, and tackling for ships; and a foundry where cannon and mortars are cast. A road is made between St. Petersburgh and Moscow, in a straight line across the forests. It is planted with trees on each side, and is three hundred and fifty-five miles in length. It was finished in 1718. The population of St. Petersburgh is about 500,000.

Such is the commercial capital of the greatest empire of the world, a place wonderful in its growth, and interesting and indeed important in its present greatness and prosperity. Russia should have a noble capital, for it is the largest empire that ever existed, occupying nearly one-sixth of the habitable globe, and extending east and west about nine thousand eight hundred miles. It is forty-one times the extent of France, or one hundred and thirty-eight that of England; but too small for the ambitious views of the late Emperor Alexander, who insisted on having the Baltic Sea to skate on—the Caspian Sea for a bathing place—the Black Sea as a washing basin—and the North Pacific Ocean as a fishing pond. Alexander encroached on Tartary for pasture, on Persia and Georgia to make a vineyard, on Turkey for a garden, seized on Poland to serve as a farm, Finland and Lapland as a hunting ground, and took part of North America for a place of banishment to those who should incur his displeasure.

ANIMATION SUSPENDED BY VOLITION.

AMONG the many descriptions of trance which have from time to time been recorded, there is one so mysterious in its nature, so inexplicable in its causes, and so utterly opposed to all that we know of the other phenomena of life, that it must always excite credulity. We allude to the power of simulating death by suspending respiration and the action of the heart; the body growing cold just as though life had actually departed. Most of the cases of this nature which have been asserted to take place, have occurred among orientals, and the majority among the Hindus. Many gentlemen of intelligence and education, whose position and character exempt them from all suspicion of deceit, profess to have seen fanatical Brahmins, after preparing themselves by fasting and prayer, and the performance of certain mystical ceremonies, submit to be buried for a given time, and who, at the expiration of the stipulated period, have been resuscitated and returned to consciousness, seemingly little or nothing the worse for the operation. These accounts have never won general acceptation, for without at all impeaching the veracity of the witnesses, the phenomenon has been ascribed to deception, carried out with that dexterity in juggling for which the natives of Hindostan are so celebrated. It is true, that if we credit those who profess to have been eye-witnesses of these marvels with truthfulness, and an ordinary amount of sagacity and vigilance, it is not easy to see how a trick could have been practised. In one instance, the man is said, at a time agreed upon, to have sunk into a state resembling death: the pulse appeared to cease, and the polished mirror held to his lips gave no sign of breath; a hole was then dug and the body deposited in it and covered with earth, and a sentry posted over the tomb of the living dead. At the time appointed the grave was opened and the man taken up, when he by slow degrees resumed his natural appearance. In this particular case the gentlemen present were certainly able to ascertain the state of the pulse, and had perceptions quick enough to detect moisture upon the glass, and it is difficult to think that they allowed the body to be spirited away before their eyes, while they believed it to be placed in the pit prepared for that purpose.

Even those of the few who have given a limited and unwilling credence to such tales, have not referred them to the action of will, but endeavoured to account for them by supposing that the Hindu fanatics take some powerful narcotic potion, sufficiently strong to suspend the natural functions for a time, and harmless enough not to destroy life; but we have the records of a case in this country, which appears to be so highly attested as to place it beyond doubt, showing, that in certain conditions of the system the mind becomes so far independent of the body, that the latter may be thrown, at the will of the individual, into a stupor not to be distinguished from death, the spirit coming back in due time to reanimate the senseless clay.

The case thus alluded to is recorded by Dr. Cheyne, in his work entitled, "English Malady," the patient being Colonel Townshend, a gentleman of character and reputation. We give the narrative in the words of the doctor:—

"Colonel Townshend, a gentleman of excellent natural parts, and of great honour and integrity, had for many years been afflicted with a nephritic complaint attended with constant vomitings, which had made his life painful and miserable. During the whole time of his illness he had observed the strictest regimen, living on the softest vegetables, and the lightest animal food, drinking asses' milk daily, even in the camp; and for common drink Bristol water, which the summer before his death he had drank upon the spot. But his illness increasing, and his strength decaying, he came from Bristol to Bath in a litter in autumn, and lay at the Bell Inn. Dr. Baynard (who is since dead) and I were called to him and attended him twice a day for about the space of a week; but his vomitings continuing still incessant and obstinate against all remedies, we despaired of his recovery. While he was in this condition he sent for us early one morning; we waited on him, with Mr. Skrine, his apothecary (since dead also); we found his senses clear and his mind calm, his nurse and several servants were about him. He had made his will and settled his affairs. He told us that he had sent for us to give us some account of an odd sensation which he had for some time observed and felt in himself; which was, that composing himself, he could die or expire when he pleased, and yet, by an effort or somehow, he could come to life again, which it seems he had sometimes tried before he had sent for us.

"We heard this with surprise, but as it was not to be accounted for by any common principles, we could hardly believe the fact as he related it, much less give an account of it, unless he were pleased to make the experiment before us, which we were unwilling he should, lest, in his weak condition, he might carry it too far. He continued to talk very distinctly and sensibly above a quarter of an hour about this surprising sensation, and insisted so much on our seeing the trial made, that we were at last forced to comply. We all three felt his pulse first; it was distinct, though small and steady; and his heart had its usual beating. He composed himself on his back, and lay in a still position some time; while I held his right hand, Dr. Baynard laid his hand on his heart, and Mr. Skrine held a clear looking-glass to his mouth. I felt his pulse sink gradually, till at last I could not feel any, by the most exact and nice touch. Dr. Baynard could not find the least motion in his heart, nor Mr. Skrine the least sign of breath on the bright mirror which he held to his mouth; then each of us by turns examined his arms, heart, and breath, but could not by the nicest scrutiny discover the least symptom of life in him. We reasoned a long time about this odd appearance as well as we could, and all of us judging it inexplicable and unaccountable, and finding he still continued in that condition, we began to conclude that he had indeed carried the experiment too far, and at last were satisfied he was actually dead, and were just ready to leave him. This continued about half an hour, by nine o'clock in the morning, in autumn. As we were going away we observed some motion about the body, and, upon examination, found his pulse and the motion of his heart gradually returning; he began to breathe gently, and speak softly, we were all astonished to the last degree at this unexpected change, and after some further conversation with him and among ourselves, went away fully satisfied as to all the particulars of this fact, but confounded and puzzled, and not able to form any rational scheme that might account for it He afterwards called for his attorney, added a codicil to his will, settled legacies on his servants, received the sacrament, and calmly and composedly expired about six o'clock that evening."

The doctor made a *post-mortem* examination of the body, which presented no other appearances than might have been expected from the character of the disease, and concludes his narration with these words—"I have narrated the facts as I saw and observed them, deliberately and distinctly, and I shall leave the philosophical reader to make what inferences he thinks fit. The truth of the material circumstances I will warrant."

Here, then, we have an instance in the case of an English gentleman, observed by two physicians and a surgeon, and minutely described by one of those physicians, who bears a high reputation, to the full as extraordinary as those asserted to have taken place in Hindostan. To philosophise or speculate about the causes of things so much beyond our knowledge would be simply ridiculous; all that can be safely supposed is, that under certain abnormal conditions which science does not yet enable us to define, spirit and body may for a time be separated and then reunited. For the rest we must be content to say with *Hamlet*—"There are more things in heaven and earth, Horatio, than are dreamt of in your philosophy."

GLACIERS.

Mont Blanc is the monarch of mountains,
They crowned him long ago,
On a throne of rocks—in a robe of clouds,
With a diadem of snow.
Around his waist are forests braced,
The avalanche in his hand,
But, ere it fall, that thundering ball
Must pause for my command.
The glacier's cold and restless mass,
Moves onward, day by day,
But I am he who bids it pass,
Or, with its ice, delay.
I am the spirit of the place,
Can make the mountain bow,
And quiver to its caverned base,
And what with me would'st thou? *Manfred.*

Glaciers are masses, or large fields of ice, formed on the summits of the highest mountains, decreasing in summer in consequence of the warmth of the temperature and other causes, and gathering new material from the snows of winter. Though glaciers are found in Norway, Sweden, Iceland, and the northern slopes of the Pyrenees, they are more peculiarly associated with the Alps. Switzerland is pre-eminently the country of the glaciers, which are associated with its history, its traditions, its superstitions, and its customs. Its history tells of the defence which these natural barriers have afforded to a hardy and free people against foes far more numerous and powerful; its traditions teem with wild tales of travellers carried away to destruction upon the face of the moving ice fields, and buried in their chasms, and of villages and hamlets cast down, and smiling vineyards and rich fields destroyed by their precipitate advance. Its superstitions relating to the doings of the demons, with which fancy peopled caves and mountains, rest upon such effects as the glacier wind, which rushes forth in the form of an icy blast, laden with frozen snow-dust, the moans and complainings of labouring ice sliding down the slopes, and the loud reports which accompany the cracking of its surface. The customs and habits are influenced by the danger and adventure of traversing the dangerous places frequented by the chamois hunter and others who live by risk of life. We always find the characteristics

GLACIERS.

of a country affect the character of the people who inhabit it, and the results are more or less prominent according as the phenomena are striking, exciting, and apparently irregular, or ordinarily tame and level in their operations, and it is no wonder that the glaciers should so powerfully have impressed themselves upon the past of Switzerland.

The Alpine glaciers are considerable in number, and of very great extent. There are about four hundred of them between Mont Blanc and the borders of Tyrol, most of them extending from ten to fifteen miles in length, and one or two in breadth, and the thickness of the ice varies between one hundred and one hundred and sixty feet. If a point could be reached sufficiently high to present a bird's-eye view of the Alps of Switzerland, Savoy, and Dauphine, the spectacle would be presented of a mass of mountains, apparently scattered without order and arrangement, and intervening valleys, bright with the vivid green of their pastures, and rich in yellow harvest. A more accurate examination would show some appearance of systematic formation. The mountains resolve themselves into separate and parallel chains, the highest being in the centre, and the minor ones, growing gradually smaller, on either side. The highest chain is the region of eternal snow and ice, a vast frozen solitude, accessible only to the chamois which feeds on the stunted lichens, the only vegetable productions capable of bearing the freezing temperature of the place. Even in summer the slopes are covered with congealed masses, the rocks only appearing where the perpendicular precipices furnish no resting-place for any accumulation. In addition to this the valleys of the central chain are also filled up with the accumulations of centuries, extending down to the edge of the inhabited valleys. The chains nearest to the centre would present the same phenomena, only in a smaller degree, and beyond those the ice and snow would not be seen.

There are two distinct kinds of glaciers—those which are situate upon slopes, and those which repose in the valleys. The former cover a larger surface, and the latter accumulate to a greater thickness, and the ice of which they are composed is of greater consistency and hardness. Where the slopes are very steep, the masses of snow, being unable to rest upon them, slide down into the valleys where they are converted into ice by an after process. The rains and the water which pours from the melting snow during the summer months steeps the whole mass, and the frosts of the next winter finding it in this state, freeze it. The ice, however, is very different from that which is found on our ponds and lakes. It is inferior in hardness, presents a rough granulated surface, and is more porous, and less transparent. The water which trickles through the snow previous to its freezing, does not drive out all the air it contains, and the air collecting in bubbles, produces opacity and diminishes consistency. The glaciers upon the slopes are changed from snow to ice in the same way, but less perfectly. From the position of the ground the water runs off more rapidly, and only accumulates in large quantities toward the bottom. The higher the elevation the less ice, and the more snow is found.

The surface of the glaciers is not one uniform level, but varies considerably according to the nature of the ground upon which they rest. Where the land is tolerably even, so, also, is the surface of the glacier; but, in rugged places, and on slopes inclining at a greater angle than thirty or forty degrees, it splits into fragments, and is piled up into chaotic masses resembling ice mountains, separated from each other by fearful gulfs and yawning chasms These piles, like the icebergs of the Arctic zone, assume every variety of grotesque shape and fantastic form, looming in the twilight like some grim monster, the tutelary deity of the place, or glittering in the sunshine with the aspect of turreted cathedral or castellated fortress. Their strange wild beauty has a fascination for the mind, once thoroughly subdued by its influence almost impossible to shake off, which is in a great measure the cause of that intense love of place, which makes the soldier in foreign lands droop away in melancholy at the sound of the *Ranz de Vache*, and the adventurous chamois hunter pine when exiled from his favourite haunts.

Among the most striking features of the glaciers are the Moraines and banks, which form at their edges and in their midst. Moraines are always found at the outer edge of a glacier, and are composed of masses of earthy matter and blocks of rock piled up sometimes to the height of more than a hundred feet. They are produced in the following manner: —When a slope is too steep for the snow to rest upon it, and is at the same time formed of rock of a soft and porous nature, the insensible action of the sharp atmosphere, and the constant attrition of water, cause its surface to moulder away. When a slip of snow takes place from above, its face is torn up and pushed forward in a heap as a sort of advanced guard to the glacier. Where the slopes are gentle enough to allow of the formation of glaciers of their own, or where the rock, instead of being stratified, is of unyielding impenetrable, granite, Moraines are not formed. Still Moraines are found in such situations, and M. Agassiz, who observed them at the height of several hundred feet above the valleys, and two thousand feet above the bed of the

Rhone, comes to the conclusion, that at some far distant date, the whole of the plains of Switzerland were covered with glaciers to the height of three thousand three hundred feet above the level of the sea, or two thousand one hundred and fifty-five feet above the lake of Geneva. He accounts for the existence of such masses of ice, by the supposition of the alternate heating and cooling of the globe at a very distant period, and uses in confirmation of his theory, the facts of fossil remains being found in the most elevated places, and blocks of stone being found in localities to which they evidently do not belong, and where they must have been transported by the agency of some vast power.

The central banks which are found in the centre of the glaciers, are of less magnitude than the Moraines, seldom reaching to a greater height than thirty or forty feet. They are largest and most numerous in the glacier of Rabasden. These banks are produced by the lateral action of the glacier. As it slips down and recedes from the sides of the valley, it carries away with it boulders, pieces of rock, stones, sand, and earth, which hang upon the edge; and, outside these, the next year's snows group themselves, and, leaving the bank between, form another mass of ice outside the original boundary.

The glaciers have their torrents and grottos both arising from the same cause. The heat of the earth is always melting the snow or ice which rests immediately upon it, and the water flowing away, often in such quantities as to innundate the valleys, and with sufficient force to sweep away whole villages, leaves behind it icy caverns sometimes a hundred feet high and eighty feet wide. The interior of these grottos is exceedingly picturesque. When the torch of the explorer flashes into their recesses, the light is reflected from thousands of glass-like tablets, and given back in all the colours of the rainbow, while the pendant icicles from roof or walls glitter with diamond-like lustre in the ray.

The question as to whether the glaciers are diminishing or increasing has long been a subject of controversy. The theory of M. Agassiz, to which we have already alluded, and which supposes Switzerland, as far as the Jura, to have been an immense bed of ice, would seem to favour the supposition that they are growing less, but we must remember that the idea broached by the philosopher, belongs to, and depends upon, conditions essentially different from those which now prevail. Still it is argued, and with truth, that an increase in the temperature of almost all European countries is going on, arising from the felling of woods, the draining of morasses, and the effects of cultivation, which, by small degrees, curtail the dominion of ice and snow. It must be obvious that the gradual action of such causes as these must have a slow effect upon an area of thousands of square miles of ice; and so far as observation goes, the difference is nearly imperceptible. Sometimes, in the case of a particular glacier, it is noticed either to advance or retreat rapidly, but it soon recovers its original position. The further it advances into the valleys the more it is exposed to a higher temperature, and rendered liable to such waste as shrinks it below its original size, and the further it retreats into the denser air of the mountains, as if to recruit its diminished strength, the more compact and solid are the icy blocks which are formed to be pushed forward in succeeding years; so that it would seem there is a compensating influence ever at work leading to corresponding diminution, and *vice versa*. This leads us to the conclusion that the glaciers preserve nearly the same extent of surface, the tendency being toward a slow contraction by the gradual rising of the temperature.

The chasms of the glaciers are attributed to two causes. When the surface of the ground upon which the ice rests is very rugged, the great weight causes it to snap in the same way as a piece of glass will if pressed down upon an uneven surface. When a great change in the temperature of the air takes place, the caverns sometimes fall in and render the support at different parts unequal, and the imprisoned air becoming rarefied, expands and burst from its bondage with a violence which shakes the ground like an earthquake, and an explosion, the sound of which reverberates among the hills like thunder. A chasm, once formed, is quickly increased by the action of the air upon its edges, the falling away of loose fragments, and the attrition of water, till the crack becomes a gulf of fifty or one hundred feet in width. These chasms are closely connected with the ice slips or falls of glaciers, which have furnished matter of dispute to the scientific world. Some have maintained that the falls of ice were brought about simply by the action of gravitation—others, that the cause was the explosion of rarefied air. The most probable conjecture is, that both these agencies combine—the air rending asunder the ice, and weakening or destroying the dependence of one part on the other, and gravitation causing the loosened mass to slide away, slowly at first, but, gathering accumulated speed in its progress, till, like a frozen thunderbolt, it dashes down, the messenger of destruction to the villages in the valleys below.

The ravages of the glacier, known as that of Weissborn, have been particularly destructive. It is situated near Randa, which place has been destroyed either partially or entirely four times in less than two centuries. In 1636, it was completely levelled, and thirty-six persons lost their lives. In 1736 and 1786 two smaller falls took place, and another in 1819, after which the dwellings were re-built in a safer situation. The tenacity with which the Swiss peasant clings to his home is, indeed, astonishing, when it could lead the villagers time after time to clear away the ice from their ruined hearthstones, and re-erect their roof trees on the very spot where the peril was most menacing. The village in question was upon the right branch of the valley of St. Nicholas, about six miles above Vispach. Perched upon the declivity of a hill, the stony ground of which had been made fertile with patient labour, with the river Visp running below it, it was at once a beautiful and a happy home, the inhabitants of which had forgotten, in nearly half a century of safety, the threatening danger of the glacier. Opposite to the hill upon which the village stood, was another of the same kind, and above all, towered the lofty rocks, the highest summit of which, rising to an altitude of nine thousand feet, is the Weissborn.

For some time the chamois hunters had perceived clefts bursting out in the face of the ice, and the rushing out of the air had boomed like the guns of a mountain train. These signs terrified a few of the more observant and timid, but did not arouse sufficient alarm to prompt any precaution. Indeed, the only effectual means of safety were to be found in flight. At length, about six o'clock in the morning of the 27th of December, 1819, a portion of the glacier upon the steepest part of the eastern side of the Weissborn became loosened, and fell with a roar louder than thunder upon the slopes and plain of ice below. In the surrounding darkness, that fearful sound was the first sign of danger, and from the mountain, like lightning from the dark thunder-cloud, there came one gleam of light, round which the darkness instantly closed again. The glacier itself did not fall upon the main portion of the village, but only on some barns at the furthest extremity. The pressure upon the air, however, was so great as to produce a violent hurricane attended by whirlwinds. So powerful was the wind, that mill-stones were cast upwards several feet, larch trees were torn up by the roots, blocks of ice, four cubic inches in size, were thrown half a league, the stone top of the belfry was carried off, and houses pulled to pieces, and the timbers carried nearly a mile into the forest. Eight goats were whirled away two hundred yards and one left alive. The remains of the avalanche covering the fields in the vicinity extended eight hundred yards in length and three hundred in breadth, and the contents were estimated to be equal to three hundred millions of cubic feet.

The most remarkable thing was, that amid all the destruction, only two persons lost their lives, the others who were buried in the ruins, or in the drifting snow, being rescued with more or less of injury.

THE YANAR.

THERE are many instances of inflammable gases issuing from the earth and burning for a long time upon a light being applied to them. These differ from the gases found in coal mines, as they are not explosive, and they do not seem to be connected with volcanic action, as they are not attended by earthquakes, or those other convulsions which accompany ordinary eruptions. In most cases these gases are emitted irregularly and intermittently, but a case occurred, in the year 1851, in which the supply seems to be continuous and regular. A farmer making an excavation, for some purpose, in the neighbourhood of Chat Moss, observer a vapour, something resembling light bluish smoke, curl upward from one particular spot. Attention being attracted to the phenomenon, attempts were made to discover its nature, in the course of which a light was applied to it, when it took fire, and burned with a pure clear flame, emitting considerable heat, and on a piece of metal tubing being inserted into the ground, the gas ascended and blazed from the top with great brilliancy. It was contemplated to lay down pipes from this gas fountain to the neighbouring farm, and apply it for lighting, cooking, and other domestic purposes.

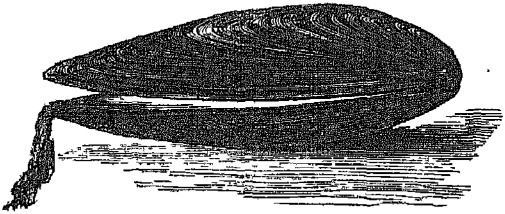
The Yanar, a phenomenon of a somewhat similar nature, was discovered by Capt. Beaufort, in the early part of the present century, on the coast of Haramania, in Asia Minor. While cruising in that locality, a light, burning steadily and continuously, had been observed night after night, among the hills, and on inquiries being made of the inhabitants, they said

THE YANAR.

it was the Yanar, and offered to lead the Captain to the spot. Accordingly, a party was formed, and proceeded through a fertile plain, to a rocky district, in the midst of which was a thickly wooded glen. The stone about the spot was of a crumbly, serpentine character, with some blocks of limestone, and there were not any indications of volcanic action. In this glen were some ruined buildings, apparently the remains of a village, and the walls of an ancient Christian Church, the interior of which was curiously ornamented, and partially covered with Latin inscriptions, mostly rendered illegible by the hand of time. Under the wall of one of the houses was a small excavation, as though the earth had been dug out. The opening was oven-shaped and about three feet in diameter, and thence a bright flame issued, giving out an intense heat, but without smoke. Trees and brushwood, grew closely round the fire, and a small brook runs close by. The earth does not seem to feel the heat, except for a few feet in the immediate vicinity. There was another hole, apparently of a similar character, at a short distance, but destitute of flame; and there was no tradition among the people, of fire having ever issued from it. It does not appear that any attempt has ever been made to ascertain the character of this gas, the emission of which is unattended with noise or any tokens of violent action. There is nothing to be seen but a brilliant, steady flame, burning perpetually, and which, it is *said*, water will not quench. Captain Beaufort imagined that this was the place alluded to by Pliny, in the following passage—"Mount Chimæra, near Phaselis, emits an increasing flame, that burns day and night." If that be the case, this natural light has probably been burning for ages, and it is likely that formerly there were many more of them, for Pliny, in his description, says "that the air of the adjacent mountains of Haphæstia was, in many places, of an inflammable character.

It is only to be expected that the locality of such a phenomenon abounds in tales and traditions of the supernatural, and, among others, the shepherds ascribe to the fire the power of detecting theft. They are in the habit of cooking their food at it, and they gravely assert that it will not roast meat which has been stolen. Five miles to the north-east there are three islands, probably the three barren Cypriæ of Pliny, called by the Turks "The Three Islands," and opposite to these, five miles in shore, is the mountain of Takhsalu, one of the Mount Taurus range, its bald isolated peak rising to the height of seven thousand eight hundred feet above the sea. There is a tradition that when Moses fled from Egypt, he abode for some time near this mountain, from which it is called Moosadaghy, or the Mountain of Moses. The Mussulmen regard this as a sacred spot, and maintain that from its summit issues a spring of the clearest water, and that in spite of the eternal snows, roses are there in perpetual bloom. In the autumn loud reports are heard, resembling the noise of the mountain artillery, described by Lewis and Clarke, in their travels in North America. The Agha of Deliktash, who gave an account of these phenomena to the explorers, said it was like a mighty groan; and on being pressed for an opinion as to its meaning, replied, that he was ignorant of its cause; adding solemnly, that he believed it was the annual summons for the departed faithful to proceed to Paradise. That reason might satisfy a follower of Mahomet, but more intelligent people, seeking for a natural cause, may with more probability ascribe it to the cracking of the frozen snow, like what happens on the glaciers of Switzerland, or the bursting of rocks, in the cavities of which water has been congealed.

Capt. Beaufort suggests that there may be some confused connection between the tradition relating to Moses and the Yanar we have described, which is possibly vaguely associated with the burning bush on Mount Horeb, recorded in the book of Exodus.



THE PINNA NOBILIS; OR, SILK FISH.

THIS curious fish is of the Mytilus or muscle species, and is found upon all parts of the Neapolitan coast, but more plentifully than any where else at Cape San Vito, to the east of Taranto, where the fishermen also find pearls and mother-of-pearl. For one of the muscle tribe, the pinna is of great size, and the Tarantines, the only people who are engaged in taking it, conduct their fishing in the following manner—They have an instrument called parmonica, made of two semi-circular bars of iron, the ends fastened together, an opening being left in the centre sufficiently large to admit and grasp the muscle. A socket is attached to one end, into which a pole of the required length is inserted, and at the other end a cord runs through a ring. Thus equipped, the fishermen peering down through the clear water, look out for their prey, and when they discover it, slowly let down the iron over the shell, press it down so as to secure its grasp, and then twisting it round, bring it up with the fish attached. The tuft of silk, which seems like the root of the shell, grows at one end, and is always imbedded in the earth. It varies in colour, according to the nature of the bottom; and where the soil is sandy, the tuft is of a glossy gold colour, but in muddy bottoms, it is dull and black, and sticks so fast, that it is with difficulty drawn up, and often broken. The shell is always in an upright position, and except when the fish is alarmed the valves are half open.

When the fishermen have caught a sufficient quantity the shells are opened, and the silk which, at Taranto, bears the name of *lanna penna*, is cut off. It is then washed twice in tepid water, once in soap and water, and twice again in tepid water, and spread upon a table till half dry. It is next rubbed with the hand, and tenderly separated into filaments, and thoroughly dried. Afterwards it is combed or carded with combs of bone, like hair-combs, the commoner sort passing through two sizes, the finer kinds are in addition passed through iron combs. It is spun with a distaff and spindle, one thread of common silk being mixed with two or three of that obtained from the pinna. Gloves, stockings, waistcoats, and larger garments, are knitted from it; the pieces when finished being rinsed in water and lemon-juice, beaten between the hands, and smoothed with a warm iron. The colour of the best kinds, when the process is completed, is either that of gold or cinnamon. This manufacture is not carried on to any great extent, and the price of the articles produced are, at least, five times that of those made of the silk commonly in use. They are very light and extremely durable, but very liable to be attacked by moths. It has been supposed that the byssus of the ancients was made of silk of this kind, and the commentators upon the Daliciæ Tarantinæ, suppose that the garments worn by the dancing women, represented in the paintings at the Museum of Portici, and called Tarantinidæ, were made from this silk.

The Pinna Nobilis has a deadly enemy in the sepia ostapedia, which the fishermen call polypa; and extraordinary tales are told of the schemes to which the sepia resorts to effect its destruction. It has also a friend or attendant sprite in the shape of a small shrimp, which is constantly on the watch to warn it of danger. This little fish, which is called the pinna's sentinel, is constantly hovering about in the neighbourhood of the pinna; and whenever an enemy makes its appearance, especially the dreaded sepia, causes a motion in the water, which acts as a signal. Upon being thus awakened to its danger, the pinna shuts its shells so closely and forcibly, and with so sharp a snap, as is almost sufficient to cut off a finger. The fishermen say, also, that the sepia with a cunning, approaching almost to reason, watches its opportunity, and hovering over the open shell of the pinna, drops a stone into it, so as to prevent its shutting; and that when the artifice fails, it strives to tear the shell from the bottom by force, and to break it to pieces. Chemnitz, the eminent naturalist, whose eminence gives great force and authority to his opinion, has alluded to these asserted facts in the tenth volume of his "Natural Historian," and also in his continuation of Martini's "Cabinet of Shells." Chemnitz treats them as fables current only among the vulgar, and arising either from misconception or imperfect observation; but the fishermen who pass their lives upon the sea, and whose vocation necessarily makes them acquainted with the creatures, which it is their business constantly to pursue, strenuously affirm their truth, and are, perhaps, entitled to greater credit than a scientific man, who treating of a variety of subjects, is only enabled to give a passing attention to each. Besides there are well authenticated instances recorded of other animals, which are parallel to those we have alluded to respecting the pinna and its sentinel and the sepia. The stratagems which foxes sometimes resort to, in order to capture shell-fish, and the shark and the pilot-fish are examples in point, which serve to establish the possibility, at least, of the tales of the fishermen being founded upon truth.

WONDERFUL AUTOMATA.

Inventive genius has at all times received universal homage, and mechanical skill has seldom gone unrewarded, either in barbaric or civilized ages. The great and important works which have been accomplished by the practical adoption of simple mechanical principles would at any time vindicate the claims of the mechanician, without whose vigilant aid civilization itself would be impossible, and the very bounties of nature would fall upon the earth waste and profitless. But beside the ordinary efforts of mechanical invention, by which the engines of peace and war, the implements of manufacture and husbandry, are produced and improved, the constructive faculty has found expression in other ways; and though, perhaps, there may be nothing more truly difficult, nothing more truly admirable in the latter over the former productions, yet there is something in them which appeals more readily to wonder, and excites a deeper interest than the sober labours of the utilitarian. Automata are in one sense but mere toys, constructed to amuse and perplex the senses, yet, when we consider the amount of ingenuity they call forth, and the extensive knowledge of mechanical principles which they demand, they will soon appear to us worthy of study, if only as instruments of education, out of which something practically useful in the economy of life may spring

Automata are by no means the invention of recent ages, nor are those produced in our time, though with all the resources of modern science to aid them, vastly superior to the mechanical contrivances of the ancients.

AUTOMATA OF THE ANCIENTS.

Homer relates that Vulcan constructed movable tripods for the banquetting hall of the gods, which advanced of their own accord to the table, and again returned to their place—

> Meanwhile the silver-footed dame
> Reach'd the Vulcanian dome, eternal frame!
> High eminent amid the works Divine,
> Where heaven's far-beaming brazen mansions shine
> There the lame architect the goddess found,
> Obscure in smoke, his forges flaming round,
> While bathed in sweat from fire to fire he flew;
> And puffing loud, the roaring bellows blew.
> That day no common task his labour claimed:
> Full twenty tripods for his hall he framed,
> That placed on living wheels of massy gold,
> (Wonderous to tell) instinct with spirit, rolled
> From place to place, around the blest abodes,
> Self-moved, obedient to the beck of gods.

Self-moving tripods are mentioned by Aristotle; and Philostratus informs us that Apollonius saw and admired similar pieces of mechanism among the sages of India. Aristotle speaks of a wooden Venus, made by Dædalus, that moved about in consequence of quicksilver being poured into its interior; but Callistratus, the tutor of Demosthenes, asserts that the statues of Dædalus received their motion from mechanical powers. Favorinus relates that Archytas of Tarentum, who flourished about 400 years before Christ, constructed a wooden pigeon which was capable of flying, but which, when it had once alighted, could not again resume the power of flight Aulus Gellius adds, that it was suspended by balancing, and animated by a concealed aura or spirit.

Among the earliest pieces of mechanism of modern times was the curious—

WATER CLOCK OF CALIPH HARUN,

Which was presented to the Emperor Charlemagne. In the dial plate there were twelve small windows corresponding with the divisions of the hours. The hours were indicated by the opening of the windows, which let out little metallic balls, which struck the hour by falling upon a brazen bell. The doors continued open till twelve o'clock, when twelve little knights mounted on horseback, came out at the same instant, and after parading round the dial, shut all the windows, and returned to their apartments.*

THE FLYING EAGLE OF REGIOMONTANUS

Has been fully described by Kircher, and other old writers on mechanics. John Muller, or as he is otherwise called, Regiomontanus, was a philosopher of considerable eminence, who flourished in the fifteenth century. He is said to have constructed an artificial eagle, which flew to meet the Emperor Maximilian when he arrived at Nuremberg, on the 7th of June, 1470. After soaring aloft in the air, the eagle is said to have met the emperor at some distance from the city, and to have returned and perched upon the town gate, where it waited his approach. When the emperor reached the gate, the eagle stretched out its wings and saluted him by an inclination of the body. Muller is likewise reported to have constructed an iron fly, which was put in motion by wheel-work, and which flew and leapt upon the table. At an entertainment given by this philosopher to some of his familiar friends, the fly flew from his hand, and after performing a considerable round it returned again to the hand of its master.

Respecting the accounts of

CHARLES THE FIFTH'S AUTOMATA

There seems some amount of fiction mingled. It is well known that the Emperor Charles V., after his abdicating the throne, amused himself in his later years with automata of various kinds, while ekeing out his last days within the walls of a monastery. The artist whom he employed was Janellus Turrianus, of Cremona. It was the custom of the emperor after dinner to introduce upon the table figures of armed men and horses. Some of these beat drums, others played on flutes, while a third set attacked each other with spears. Sometimes he let fly wooden sparrows, which flew back again to their nest. He also exhibited corn-mills so extremely small that they could be concealed in a glove, and it is said that these were so powerful, that they could grind in a day as much corn as would supply eight men with food for a day —a capability we are very much inclined to doubt.

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* Annales Loisiliani.

THE AUTOMATON COACH,

Invented by M. Camus, for the amusement of Louis XIV. when a child, was a very ingenious piece of mechanism. It was drawn by two horses, and contained the figure of a lady within, with a footman and page behind. When this machine was placed at the extremity of a table of the proper size, the coachman smacked his whip, and the horses instantly set off, moving their legs in a natural manner, and drawing the coach after them. When the coach reached the opposite side of the table, it turned sharply at a right angle, and proceeded along the adjacent edge. As soon as it arrived opposite the place where the king sat, it stopped; the page descended, and opened the coach door; the lady alighted, and with a curtsey presented a petition, which she held in her hand, to the king. After waiting some time she again curtsied, and re-entered the carriage. The page closed the door, and having resumed his place behind, the coachman whipped his horses and drove on. The footman, who had previously alighted, ran after the carriage, and jumped up behind into his former place.

Still more perfect were the contrivances of General Degennes, who was not content with imitating the movements of animals, but even ventured to imitate the functions of vitality. His

AUTOMATON PEACOCK

Was so constructed as to walk about as if alive; it picked up grains of corn from the ground, and appeared to digest them in the manner of a living animal. Degennes is said to have constructed clocks without weights or springs, and to have contrived machines of great use in navigation and gunnery. Doubtless to the example of the success of Degennes we owe the several

AUTOMATA OF VAUCANSON,

All of which were admirably contrived, and, perhaps, the most remarkable of any, except those constructed of very late years. Vaucanson made a figure that played on the flute; the same gentleman also made a duck which was capable of eating, drinking, and imitating exactly the voice of a natural one; and, what is still more surprising, the food it swallowed was evacuated in a digested state, or considerably altered in the principles of solution; also the wings, viscera, and bones, were formed so as strongly to resemble those of a living duck, and the actions of eating and drinking showed the strongest resemblance, even to the muddling of the water with its bill. Vaucanson's figures were imitated by one Du Moulier, a silversmith, who travelled with them through Germany in 1752, and died at Moscow in 1765. Beckman says he saw several of them after the machinery had been deranged; but that the artificial duck, which he regarded as the most curious, was still able to eat, drink, and move. Its ribs, which were made of wire, were covered with ducks' feathers, and the motion was communicated through the feet of the duck by means of a cylinder and fine chains, like that of a watch.

M. DROZ'S INVENTIONS.

M. Le Droz, of La Chaux de Fonds, in the province of Neufchatel, also executed some very curious pieces of mechanism. One was a clock, presented to the king of Spain; which had, among other curiosities, a sheep that imitated the bleating of a natural one, and a dog watching a basket of fruit, that barked and snarled when any one offered to take it away; besides a variety of human figures, exhibiting motions truly surprising.

Another automaton of Droz's was the figure of a man, about the natural size, which held in the hand a metal style, and, by touching a spring that released the internal clockwork from its stop, the figure began to draw on a card; and having finished its drawings on the first card, it rested, and then proceeded to draw different subjects on five or six other cards. The first card exhibited elegant portraits of the king and queen, facing each other; and the figure was observed to lift its pencil with the greatest precision, in the transition from one point to another, without making the least slur.

To some extent automata associate themselves with the tricks of the juggler as efforts of legerdemain, and this is particularly the case with those which imitate the human voice, which are always in danger of being suspected to be the work of ventriloquism, rather than the legitimate accomplishments of positive science. Nevertheless, although numerous speaking and singing automata have been constructed on scientific principles, with greater or less success, many of those which were mere deceptions, have been so ingeniously contrived as to be worthy of notice in this article

History informs us that when Darius Hydaspes ascended the throne, and allowed his subjects to prostrate themselves before him as a god, the divinity of his character was impressed upon his worshippers by the bursts of thunder and flashes of lightning which accompanied their devotion. History has of course not informed us how these effects were produced, but it is probable that in the subterraneous and vaulted apartments of the Egyptian labyrinth, the reverberated sounds were produced by concealed machinery provided for the purpose The principal acoustic mechanism used by the ancients consisted of

SPEAKING AND SINGING HEADS,

Which were constructed for the purpose of representing the gods, or of uttering oracular responses. Among these, the head of Orpheus, which uttered its responses at Lesbos, is one of the most famous. It was celebrated, not only throughout Greece, but even in Persia; and it had the credit of predicting, in the equivocal language of the heathen oracles, the bloody death which terminated the expedition of Cyrus the Great into Scythia The celebrated mechanic Gerbert, who filled the papal chair, A.D. 1000, under the name of Sylvester II, constructed a head of brass, which is said to have uttered a few responses. Albertus Magnus executed a head in the thirteenth century, which not only moved, but spake. It was made of earthenware, and Thomas Aquinas is said to have been so terrified when he saw it, that he broke it in pieces, upon which the mechanist exclaimed, "There goes the labour of thirty years."

An exhibition which created much surprise a few years ago under the name of

THE INVISIBLE GIRL,

Was nothing else than an ingenious cheat. Although strictly, this was no automaton at all, but a contrivance to conceal the person of a living speaker, yet, from the noise it created at the time of its exhibition, and the success which attended it, it was a puzzle to the curious, and certainly deserves to be remembered.

M. MAILLARDET'S SINGING BIRD

Was a very successful application of the law of acoustics. This automaton was exhibited in Edinburgh many years ago, and was regarded at the time as the most wonderful production of the day. An oval box, about three inches long, was placed upon a table, and in an instant the lid flew up, and a bird, the size of a humming bird, and of the most beautiful plumage, started from its nest. After fluttering its wings, it opened its bill and performed four different kinds of the most beautiful warbling. It then darted down into its nest, and the lid closed upon it. The moving power in this piece of mechanism is said to have been springs, which continued their action only four minutes. As there was no room within so small a figure for accommodating pipes to produce the great variety of notes which were warbled, the artist used only one tube, and produced all the variety of sounds by shortening and lengthening it with a movable piston. All these inventions were put in the shade by the celebrated

AUTOMATON FLUTE PLAYER,

Of Vaucanson, which was exhibited in 1736, and produced an extraordinary sensation. When it came to Paris, M. Vaucanson exhibited it, and explained the whole of the mechanism to a committee of the Academy of Sciences. This learned body was astonished at the ingenuity it displayed; and they did not hesitate to state, that the machinery for producing the sounds of the flute, performed in the most exact manner the very operations of the most expert flute player, and that the artist had imitated the effects produced, and the means employed by nature, with an accuracy which exceeded all expectation.

The body of the flute player was about five feet and a half high, and was placed upon a piece of rock, surrounding a square pedestal four feet and a half high by three and a half wide. When the panel which formed the front of the pedestal was opened, there was seen, on the right, a clock movement, which, by the aid of several wheels, gave a rotary motion to a steel axis two feet and a half long, having cranks at six equidistant points of its length, but lying in different directions. To each crank was affixed a cord, which descended and was fixed by its other end to the upper board of a pair of bellows, two feet and a half feet long and six inches wide. Six pairs of bellows arranged along the bottom of the pedestal were there wrought, or made to blow in succession, by turning the steel axis.

At the upper face of the pedestal, and upon each pair of bellows, is a double pulley, one of whose rims is three inches in diameter, and the other one inch and a half. The cord which proceeds from the crank, coils round the smallest of these pulleys, and that which is fixed to the upper board of the bellows goes round the larger pulley. By this means the upper board of the bellows is made higher than if the cords went directly from them to the cranks.

Round the larger rims of three of these pulleys, viz. those on the right hand, there are coiled three cords, which, by means of several smaller pulleys, terminate in the upper boards of other three pair of bellows placed on the top of the box.

The tension of each cord when it begins to raise the board of the bellows to which it is attached, gives motion to a lever placed above it, between the axis and the double pulley in the middle and lower region of the box. The other end of this lever keeps open the valve in the lower board of the bellows, and allows the air to enter freely, while the upper board is rising to increase the capacity of the bellows. By this means there is not only power acquired, in so far as the air gains easier admission through the valve, but the fluttering noise produced by the action of the air upon the valves is entirely avoided, and the nine pair of bellows are wrought with great ease, and without any concussion or noise.

These nine bellows discharge their wind into three different and separate tubes. Each tube receives the wind of three bellows, the upper boards of one of the three pair being loaded with a weight of four pounds, those of the second three pair with a weight of two pounds, and those of the other three pair with no weight at all. These three tubes ascended through the body of the figure, and terminated in three small reservoirs placed in its trunk. These reservoirs were thus united into one, which, ascending into the throat, formed by its enlargement the cavity of the mouth terminated by two small lips, which rested upon the hole of the flute. These lips had the power of opening more or less, and by a particular mechanism, they could advance or recede from the hole in the flute. Within the cavity of the mouth there is a small movable tongue for opening and shutting the passage for the wind through the lips of the figure.

The motions of the fingers, lips, and tongue, of the figure, were produced by means of a revolving cylinder, thirty inches long, and twenty-one in diameter. By means of pegs and brass staples fixed in fifteen different divisions in its circumference, fifteen different levers, similar to those in a barrel-organ, were raised and depressed. Seven of these regulated the motions of the seven fingers for stopping the holes of the flute, which they did by means of steel chains rising through the body, and directed by pulleys to the shoulder, elbow, and fingers. Other three of the levers communicating with the valves of the three reservoirs, regulated the ingress of the air, so as to produce a stronger or a weaker tone. Another lever opened the lips so as to give a free passage to the air, and another contracted them for the opposite purpose. A third lever drew them backwards from the orifice of the flute, and a fourth pushed them forward. The remaining lever enabled the tongue to stop up the orifice of the flute.

But the crowning triumph of acoustic invention, and the most successful of automaton labour, is

THE SPEAKING AUTOMATON OF M. FABER,

Which was exhibited in London, and startled both philosophers and sight-seers by its wonderful imitations of the human voice. Among the automata contrived to imitate the gestures and motions of the human body

MAILLARDET'S CONJUROR

Was one of the most ingenious. A figure, dressed like a magician, appears seated at the bottom of a wall, holding a wand in one hand and a book in the other. A number of questions ready prepared are inscribed on oval medallions, and the spectator takes any of these which he chooses, and to which he wishes an answer; and having placed it in a drawer ready to receive it, the drawer shuts with a spring till the answer is returned. The magician then rises from his seat, bows his head, describes circles with his wand, and consulting the book, as if in deep thought, he lifts it towards his face. He then raises the wand and strikes the wall, when two doors fly open and display an appropriate answer to the question. The doors again close, the magician resumes his original position, and the drawer opens to return the medallion. There are twenty of these medallions, all containing different questions, to which the magician returns the most suitable and striking answers.

Upon examining the edge of the circular medallion, Mr. Brockedon discovered in all of them a small hole concealed by the milling. This led Mr. Brockedon to examine the receptacle for the medallion in the drawer, and he observed the edge of a pin flush with the edge of the receptacle, whence the pin was protruded by the machine into the hole of the medallion, the depth of the hole regulating the answer.

The last instance of automaton celebrity worthy of enumeration here is the

AUTOMATON CHESS-PLAYER,

Which, in a strict sense, was no automaton at all, but a successful cheat. Such was the success of it, and so eventful the history, that we may consider it the most wonderful example of the kind on record.

In the first place it is necessary we should state that an automaton chess-player is an impossibility. Chess is a game dependent on the mind of the player for its merit and peculiarity—there is no rule beyond the established law of the game—the specific mode of playing depends on the relative skill, intention, and position of the player. It is in fact a game of skill, and must be carried forward by a mind continually inventing new positions, or adopting new modes of defence against the antagonist. As long, therefore, as the real nature of the automaton chess-player was unknown, its remarkable movements and astonishing success in play rendered it a wonder of wonders, and it seemed as if machinery had at last arrived at a capability of thinking.

The chess-automaton was the invention of M. de Kempelen, a native of Hungary, who derived the idea from some magnetic experiments performed at Vienna in 1769—what magnetism had to do with the invention the reader will see anon During the exhibition, the Empress Maria Theresa entered into conversation with De Kempelen relative to the experiments they were observing, and he then hinted that he could produce effects still more surprising than the magnetic experiments they were then witnesssing. The empress took him at his word, and in six months he appeared again at the court of Vienna attended by the chess-automaton.

Here was a machine presented which imitated the movements of a chess-player, and which played with men who were eminent for their skill in chess, not merely correctly, but with such skill as invariably to beat them. The greatest possible amount of attention was excited by such an exhibition, and the most accomplished men were as much puzzled as the most ignorant, as to its structure and mode of operation. Accounts of it were published in every part of Europe, and the smallest scrap of intelligence respecting its movements from place to place, was seized with avidity by newspapers and journals, and blazoned forth with exaggeration and eclat.

Everybody believed its genuineness as a mechanical marvel. An account of it, published by a friend of the inventor, was entitled, "Inanimate Reason; or, a Circumstantial Account of that astonishing piece of mechanism M. de Kempelen's Chess-player." This author tells us, that on witnessing the performance of the chess-player, he, in common with many others, felt certain that the box on which the figure sat contained a living person to guide its movements; but what was his astonishment when the inventor opened the box and showed it contained a series of drawers, at the same time opening all parts of the instrument to the inspection of the company, who were invited to view its mechanism with lights. "I examined," says he, "the minutest corner of it, without being able to find anything throughout the whole capable of concealing an object the size of my hat."

Soon after its first exhibition the inventor received many liberal offers for the secret of his invention, but refused them all. He even threw aside the automaton, in order to devote his talents to studies of more importance, being no mere adventurer, but a mechanician of high order, who prized the chess-automaton least of his inventions, because, though more popular than any, it was less useful, and in no sense anything but a cheat. He had, in fact, partly taken it to pieces, and left it some years in a dilapidated state, in which condition it would have remained but for the following circumstances:—The Grand Duke Paul of Russia, with his consort, under the travelling title of the Count and Countess du Nord, visited the Emperor Joseph the II., at Vienna; and the emperor wishing to gratify his guests, called to his aid M. de Kempelen, and his machine. Kempelen immediately got the machine into working order, and exhibited it in the court. A new fervour was excited by its skilful playing, and Kempelen was advised to visit the continental cities, an advice which he adopted, and in 1783 arrived in his travels at Paris. In the French capital it played with the most distinguished players and got beaten; but so far from diminishing, this circumstance gave it new reality, and its fame became greater than ever.

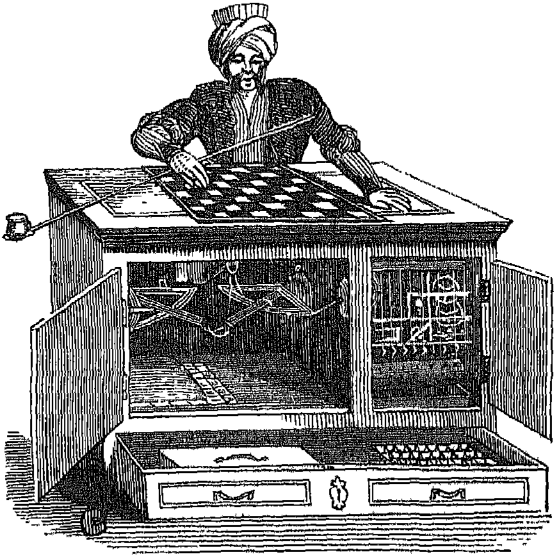
It proved profitable too, and De Kempelen pushed on to London, and engaged apartments at 8, Saville Row, Burlington Gardens. At this time chess was much played by the fashionables in England, and great success attended the speculation of the inventor. The journals teemed with notices of its triumphs; and what was really worthy of note was, that the automaton won nearly all the games it played, though it came into contact with players of the highest experience and celebrity. As in all other cases, however, success brought envy, and numerous pamphlets appeared characterising it as an imposition on public credulity, a mere sham worked by a concealed player, and hence no automaton at all. The opinion that a player was concealed within it became very common; and it was asserted that certain parts of the machine had been seen to shake when they should have been quite still. Up to this time, however, the real secret was not known, and the automaton travelled on, and met with continuous success. At last it arrived at Berlin, and Frederick the Great became a purchaser of the secret at an enormous price. But like a child who cries after a toy, he no sooner became its possessor than he threw it aside, and left it for many years neglected and forgotten.

In 1804, M. de Kempelen died, and when Napoleon occupied Berlin in 1806, the automaton chess-player was brought out from its retreat and resuscitated; its movements once more amusing the *elite* and astonishing the world. Napoleon played several games with it. After some half-dozen moves he purposely made a false move, the figure inclined its head, replaced the pieces, and made a sign for Napoleon to play again. Presently, he again played falsely; this time the automaton removed the offending piece from the board, and played his own move. Napoleon was delighted, and to put the patience of his taciturn opponent to a severer test, he once more played incorrectly, upon which the automaton raised his arm, and, sweeping the pieces from the board, declined to continue the game

After a second tour of the leading cities in Europe, where it was received with unabated enthusiasm, in 1819 it was again established in London. Of its subsequent history but little is known. For some years it was exhibited in Canada and the United States, and was finally understood to have returned to New York, where it has remained ever since.

Of the appearance, and manner of exhibiting this remarkable figure, the reader will obtain a pretty intelligible idea from the cut prefixed, and the following brief description—

Upon entering the apartment where it was exhibited, the automaton, attired in handsome Turkish costume, was seen seated behind a chess-board, affixed to a chest, about three feet high, two feet deep, and four feet long. Both the figure and the wooden chair on which he sat were attached to the chest, and this being upon castors, the whole was moved with facility about the chamber. The exhibitor commenced operations by showing the interior of the chest, which was divided by a partition into two unequal parts, both apparently so occupied by machinery that the concealment of a human being appeared impossible. After opening the doors in front and behind, pulling out, at the same time, a long shallow drawer, at the bottom of the chest, containing a



set of chess-men, a cushion, and some counters, two lesser doors were also opened; and then, in order to make the exposure of the inside complete, lights were shown at the back openings, enabling the spectators to see right through the interior. The machine was then turned round, and lights were again exhibited at the different openings, in such a way that every corner seemed visible. At the same time, the automaton's robe was turned over his head, so as to display the internal structure, which was seen to be full of wheels, cylinders, and other clock-work; and, in this exposed state, the whole apparatus was wheeled round, for the inspection of the visitors. After allowing sufficient time for examination, the exhibitor closed all the doors, removed the machine behind a balustrade, and invited any one who chose to play a game of chess.

As soon as an antagonist appeared, the eyes of the figure were apparently directed to the board, and, after some moments of seeming meditation, it began the battle First, leisurely raising its arm from the cushion on which it rested, the hand was directed towards the piece to be played; the fingers then opened, took hold of the piece, and deposited it on the proper square; while, during the operation, a noise of wheel-work was heard, which ceased only when the automaton's arm had returned to rest again on the cushion. Many attempts, like that just related of Napoleon, to disconcert it, by playing falsely, were made for fun by visitors, but always without success; for, upon the least infringement of the established rules of the game, the automaton, after tapping upon the chest, with an air of offended dignity, would replace the erring piece, and then proceed to take advantage of the illegal move, by playing one of his own men.

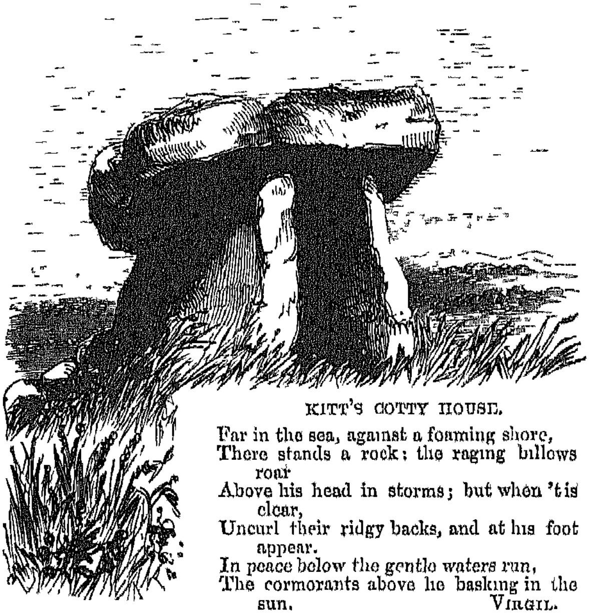
Upon the termination of every game, the doors were again unclosed, and the whole machine subjected to a second inspection by the persons present.

It is certainly difficult, in the face of this gratuitous display of the whole internal structure of the machine, to conceive the possibility of a concealed confederate, and yet, such is the simple and unscientific solution of this celebrated mystery. The chess-player who directed the movements of the automaton was really hidden in the interior; and all that mass of finely-executed clock-work, wheels, and springs, and cylinders, so ostentatiously exhibited to the admiring world, was merely a sham, substantial enough in appearance to fill up every portion of both chest and figure; but so contrived, that it would collapse or expand to suit the exigences of the hidden agent's various positions while the inside was shown. Thus, during the exhibition of one portion of the machinery, he was enabled to take refuge in another, sometimes in the body of the automaton, and at others in a portion of the chest. These changes were of course in obedience to preconcerted arrangement, and a few repetitions were sufficient to accustom him to the routine. While conducting a game, he sat at the bottom of the chest, with a small pegged chess-board and men on his lap, and a lighted taper affixed; within reach were a handle by which he could guide the arm of the automaton, an elastic spring for moving its fingers, and a cord in communication with bellows for producing the sound of "Check." The most ingenious and interesting part of the contrivance remains to be told. Most scientific men concurred in attributing the phenomena of these performances to human agency; but even admitting the concealment of a player in the chest, the means by which he could be informed of the moves made on the automaton's chess-board, baffled all conjecture. Some supposed that he looked through the beard or waistcoat of the figure; others, that an intimation of every move was conveyed to him by the exhibitor; but, upon reflection, insuperable objections to both these theories were found, and the problem remained unsolved, till M. Mouret himself furnished an account of all the mysteries connected with the automaton. From him we learn that the concealed player was seated immediately under the chess-board of the automaton, and that the reverse of this chess-board, which formed part of the ceiling of his narrow cell, was an exact representation of the chess-board above, but to the side presented to the imprisoned player, *at every one of the sixty-four squares, was suspended by the finest silk, a tiny metallic ball.* Now, as the chess-men with which the automaton played above, had each of them a magnet inside, the moment any one of them was placed upon a square, it attracted the little ball attached to the corresponding square below, and fixed it to the board, so that, by the time the exhibitor had arranged all the men on the board, thirty-two (the number of the pieces) of the balls beneath would be drawn up close to the under chess-board, while the other thirty-two would remain suspended. To illustrate this portion of the subject, we will imagine the pieces duly arranged, and the game about to be opened by the automaton. Looking up at the chess-board on his little ceiling, he sees, by the thirty-two balls drawn up, that the men are properly placed on the board before the public, so, duly turning the handle which directs the arm of the figure, and putting in motion the springs by which its fingers act, he causes it to take up the piece intended to be played, and, watching the board on his ceiling at the same time, he observes, as the automaton's fingers take up the piece, the corresponding ball to fall, as before described, and when this piece is placed on the destined square, he sees also the ball below it drawn up. Having completed his first move, and carefully repeated it on the small board in his lap, he sits anxiously waiting the move of his opponent. Presently, he sees one little ball fall, and another rise; he makes the moves thus indicated on his own board, and in this manner proceeds with the game to its conclusion.

The man who acted as invisible confederate, on the revival of the automaton, was M. Mouret, an expert player, of small stature, who played his part in the affair to perfection. The proprietor, after Kempelen's death, was M. Maelzel. Wherever the automaton was taken, success attended it as before; and Maelzel and Mouret shared large profits with each other On one occasion, the king of Holland sent for the automaton, and, presenting Maelzel with three thousand francs, commanded him to exhibit. Mouret had had a claim against his employer standing some time, and determined now to have a settlement. The performance was to commence at half-past twelve. Twelve o'clock came, and Mouret was not at his post. Maelzel hastened to him, and found him in bed, complaining of fever. "Why, you were very well just now," said Maelzel. "Yes, but this is a sudden attack."—"The king will be here presently."—"I can't help it; tell him the automaton has got the fever."—"Come, this joking won't do; let me call a physician!"—"There is only one means of subduing my fever."—"What is that?"—"Pay me the 1500 francs you owe me!"—"I'll pay you to-night!"—"No! this moment, or the fever must continue." The cash was paid, and the automaton went to work, and never was more successful. It beat the Dutch Minister of War, and created quite a sensation at the Court by its admirable tact in playing.

It is interesting to know that the games played by the automaton are now preserved as models suited for the study of the student of chess, and for the amusement of the chess-proficient. The latter days of the automaton were spent in America, and it now remains in a lumber-room in New York, its former celebrity forgotten, and its curious history almost uncared for.

WONDERFUL ROCKS AND HEADLANDS.



KITT'S COTTY HOUSE.

Far in the sea, against a foaming shore,
There stands a rock: the raging billows roar
Above his head in storms; but when 'tis clear,
Uncurl their ridgy backs, and at his foot appear.
In peace below the gentle waters run,
The cormorants above lie basking in the sun.
VIRGIL.

Rocks and headlands are interesting both as natural objects and as historical monuments. From the earliest ages of Biblical antiquity, to the latest events of these railroad times, the rocky ramparts and summits of the hills have been associated with human passions and emotions, and have been the scenes of great conflicts and stirring vicissitudes. On the rocky heights of Sinai, amid the awful tumult of the elements, Moses received the tables of stone from the hands of the Lord; at Horeb, while the hurricane whirled along, and the lightning shivered the mountain, and blasted the forest, the voice of peace and love broke forth upon the ear of the prophet, and God proclaimed himself at hand; and in the hour of privation, while Israel wandered in pain from the land of bondage, the patriarch smote the rock, and produced a gushing fountain in the wilderness. Egypt, India, Arabia, have their wonderful rocks, their wonderful passes, and their deep hewn caves, where tradition still sits babbling of the past, and the religion of antiquity still finds votaries to solemnise its fearful rites; while, in our own land, this sea-girt isle, this white-cliffed Albion, the rocky heights are full of meaning to the lover of the picturesque, and the student of our country's geology. Respecting the rocks and caverns of Egypt and India, sufficient has been already said in earlier portions of this work; let us now turn in another direction, and gain a few glimpses of nature's monuments and traditions.

ERRATIC BLOCKS

Are sprinkled over nearly every country in Europe, and in many parts of America are the chief features of the scenery for many miles. These boulders belong to the diluvian period, and sometimes have their origin in the rocks near to the spots where they are found, and sometimes have been transported to their present sites from localities many miles distant. The mode in which such enormous blocks of stone could be borne along, has caused considerable difference of opinion amongst geologists, but it is pretty well agreed that glaciers have been the chief instruments in such a work; though great and rapidly moving floods may, in many instances, have accomplished it. At Gloucester, Massachusetts, there is an extensive plain covered for miles with huge stones, some of them weighing many tons each, which appear as if scattered by sportive Titans, who had flung them at each other, in an exhibition of muscular energy, and had then left them to astonish wondering mortals.

The beds of gravel so frequent in this country along the eastern coast, from the Thames to the Tweed, are instances of the same age of great floods by which these erratic blocks were produced; and in these gravel districts, blocks of stone are very frequent, not merely in low situations, where we could imagine them to roll during a watery convulsion, but frequently poised on high lands, and even on the summits of hills, in such a manner as to prove that a glacier, or immense mass of ice, must have borne them, and left them, as it melted, poised in these delicate positions. In the gravel deposits of Derbyshire, there are fragments of almost all the English formations, from granite to chalk, and it would not be difficult to collect specimens of all the English rocks from these gravel beds. A fine specimen in this district is

ROBIN HOOD'S STRIDE,

A curious cluster of rocks at Burchoven, in Youlgrave, Derby shire. It is, sometimes, called Mock Beggar's Hall, and is said to have been the scene of many of Robin Hood's exploits, in those days

> When Robin Hood and little John,
> In Sherwood's haunts held royal courts,
> And all the greenwood owned their sway.

This is a series of rocky masses curiously piled one on the other, apparently in the most artificial manner, and surrounded by huge clefts of riven blocks, all bearing traces of having suffered in many conflicts with the elements. Similar in structure to Robin Hood's Stride, are

THE HIGH ROCKS AT TUNBRIDGE,

In the midst of the romantic scenery of Tunbridge and Tunbridge Wells. These rocks present many features of geological interest, and are, in the highest sense, picturesque.

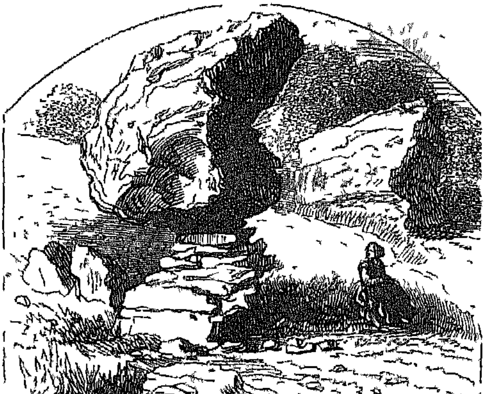
·Near the road, which is delightfully situated, may be seen the High Rocks. Sixpence is paid for each person to Mr. Jacob, who keeps the little inn, called the "Cape of Good Hope," opposite the gate, and who rents the site of these picturesque masses from the Earl of Abergavenny, on whom it devolves to keep the road to them in repair.

The High Rocks form a semicircular range, according with the prevailing ingredient of the soil, which is, indeed, the characteristic feature of the surrounding country: it is a sandstone of considerable hardness. Where this lies near the surface, as the light soil is washed away, considerable prominences are presented to the eye; and, when blended with the verdure of trees and shrubs, cannot fail to be highly gratifying to the observer. In some places, where the inequality of the ground has favoured more extensive failures of the adjacent soil, these protuberances are of considerable magnitude, of which the High Rocks are a remarkable instance. One of them, the Bell Rock, is so called from its being sonorous when struck with a stick, which is generally lying against it for that purpose. At a considerable depth below the surface the sand becomes white, and of a delicate fineness. In some instances, in the vicinity, the excavations made in consequence appear as if they were caverns.

Numerous plants were growing freely about the High Rocks at the time just alluded to, among which, in surprising abundance, was the *oxalis acetocella*, with its three heart-shaped pendulous leaflets, its flower exquisitely veined with purple; and the beautiful whortleberry, with its singular heath-like flowers and its bright green leaves, so often used by the rustic matron in place of veritable tea. Hollies, pines, and firs are also plentiful. Visitors acquainted with botany will find here ample means of instruction and amusement: heaths of great variety and beauty; forest shrubs and rock plants shoot forth, indeed, with marvellous abundance.

We may pass from one surface to another, richly overgrown with verdure, of these masses of sandstone. Of another spot Cowper says:

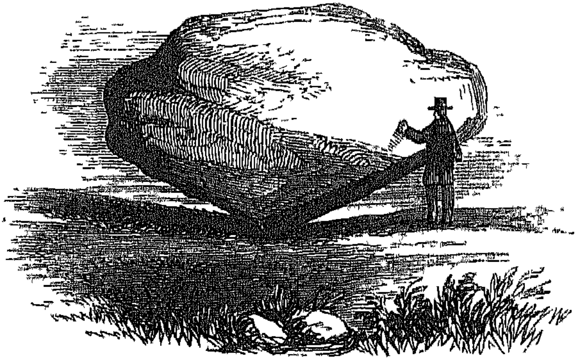
> "Not all its pride secures
> The grand retreat from injuries impress'd
> By rural carvers, who with knives deface
> The panels, leaving an obsure, rude name,
> In characters uncouth, and spelt amiss
> So strong the zeal t' immortalize himself
> Beats in the breast of man.



The Toad Rock, at Rustall Common, is a strangely confused heap of broken masses, poised on a narrow column of laminated fragments, and bearing some resemblance to a crouching toad. Great rough masses lie on every hand, all thrown about with the wildest and most picturesque disorder; though the toad rock, from its strange form and prominent position, most quickly arrests the eye of the spectator.

Many of the erratic blocks scattered in various places are remarkable for their great size. That out of which the pedestal of the Statue of Peter the Great was hewn, weighed fifteen hundred tons, and was an insulated drifted mass of granite, that lay on a marshy plain near the city of St. Petersburgh, from whence it was removed on rollers and cannon-balls, while the ground of the marsh was frozen hard.

The Needle Mountain in Dauphiny, described as erratic, is a thousand paces in circumference at the top, and two thousand at the base. Near Neufchâtel a mass of granite occurs, forty feet high, fifty long, and twenty broad, estimated to weigh 3,800,000 pounds. On the Jura limestone mountains, at an elevation of 2000 feet above the Lake of Geneva, there are granitic blocks, the solid contents of which amount to 1200 cubic feet upon the Salere, to 2250 on the Côteau de Boissy; and the block called *Pierre à Martin* is mentioned by Mr. Greenough as containing even 10,296 cubic feet. The rock in Horeb, from which, according to monkish tradition, the leader of Israel miraculously drew water, is a mass of granite, six yards square, containing 5823 cubic feet, lying upon a plain near Mount Sinai. In the United States, boulders occur of equal dimensions. "On Cape Awn, and its vicinity," says Dr. Hitchcock, "I have not unfrequently met with blocks of sienite not less than thirty feet in diameter; and in the south-east of Bradford county,



THE ROCKING STONE, FALL RIVER.

I noticed one thirty feet square, which contains 27,000 cubic feet, and weighs not less than 2310 tons. In the west part of Sandwich, near Cape Cod, I have seen many boulders of granitic gneiss, twenty feet in diameter, which contain 8000 cubic feet, and weigh as much as 680 tons. Two graywacke boulders of the same size lie a few rods distant from the meeting-house in Norton, in Dr. Bates's garden. A granite boulder of equal dimensions lies about half a mile south-east of the meeting-house in Warwick; and one of similar dimensions lies on the western slope of Hosac mountain, at least 1000 feet above the valley over which it must have been transported. One of granite lies at the foot of the cliffs at Guy Head, on Martha's Vineyard, which is ninety feet in circumference, and weighs 1447 tons. At Fall river there is a boulder of conglomerate which originally weighed 5400 tons. But the instances are endless that might be given of similar large and insulated masses, now lying at a remote distance from the parent rocks from which they have been abstracted. Wandering in the southern extremity of America, Mr. Darwin speaks of his course being obstructed by well-rounded pebbles of porphyry, mingled with immense angular fragments of basalt and of primary rocks, nearly seventy miles apart from the nearest analogous mountain; while in Europe the vast plains of

BLOCK IN PEMBROKESHIRE.

Prussia, Poland, and Russia, comprehending a zone of country near 2000 miles long and from 400 to 800 miles wide, are strewed with loose detritus and crystalline blocks of colossal size, all of which have been transported from the mountain masses of Scandinavia.

A huge block of

DRIFT STONE IN PEMBROKESHIRE

Has long puzzled tourists and antiquarians as to its origin. It is mounted on three low rocky peaks, and has all the appearance of having been so placed by human agency. But considering *its immense size, and the chances in favour of such a deposition* under the occasional circumstance of the diluvian period, it is probably a work of nature, and in no sense a monument of the Druids.

But the mystery of these rocking, and strangely poised rocks, is in a measure solved by the fact noticed by observers of the granite masses of Silesia, and the Swiss Alps, namely, that at the time the rocks were deposited in the spots where we now find them, they rested on broad foundations, but that decay has proceeded faster in one part of the stone than in another, and hence their balanced condition is the work of time. A great number of examples occur around the islands of Scotland, of huge masses of granite having been worn away, and separated into fragments, by the action of the sea; and, in the case of the

BULLERS OF BUCHAN,

Numerous arches and caves have been produced, into which the sea rushes with strange noises and repeated echoes. The summit of Mount Bennachie supplies an example of the manner in which granite yields to the decomposing power of the atmosphere, having been separated into huge masses or blocks, irregularly piled, by the mouldering away of the base. This crumbling of rocks at the base explains very readily the secret of such instances of poised blocks as that afforded by

THE LOGAN STONE,

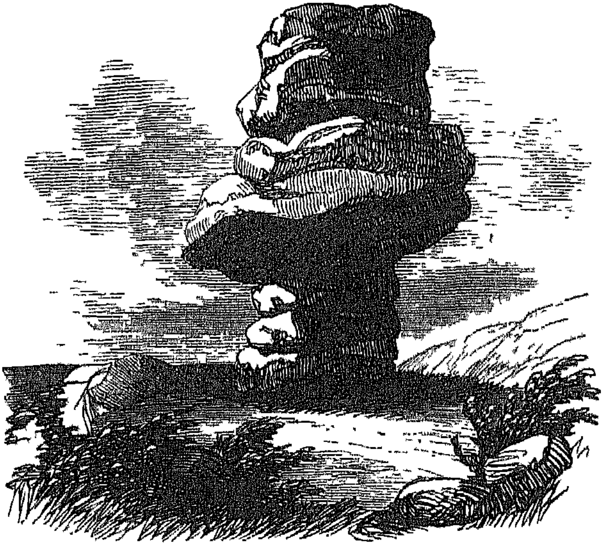
Near the Land's End, in Cornwall. This is an enormous mass of granite so delicately balanced that the strength of one man was, till recently, sufficient to set it in motion. "This far-famed rocking-stone," says Mr. Collins, in his recent work, entitled 'Rambles beyond Railways,' "rises on the top of a bold promontory of granite jutting far out into the sea, split into the wildest forms, and towering precipitously to a height of a hundred feet. When you reach the Logan Stone, after some little climbing up perilous-looking places, you see a solid, irregular mass of granite, which is computed to weigh eighty-five tons, resting *on its centre* only, on a flat, broad rock, which, in its turn, rests on several others stretching out around it on all sides. You are told by the guide to turn your back to the uppermost stone; to place your shoulders under one particular part of its lower edge, which is entirely disconnected, all round, with the supporting rock below; and in this position to push upwards slowly and steadily, then to leave off again for an instant, then to push *once more*, and so on, until after a few moments of exertion, you feel the whole immense mass above you moving as you press against it. You redouble your efforts, then turn round and see the massy Logan Stone, set in motion by nothing but your own pair of shoulders, slowly rocking backwards and forwards with an alternate ascension and declension, at the outer edges, of at least three inches. *You have treated eighty-five tons of* granite like a child's cradle; and, like a child's cradle, these eighty-five tons have rocked at your will!"

It is not so easily moved as formerly, owing to a slight decay of the protrusion of its base which formed the pivot of its motions. Six-and-twenty years ago it was overthrown by artificial means, and then lifted again into its former position.

Another Cornish wonder is the

CHEESE-WRING,

Which is thus described by Mr. Collins—"If a man dreamt of a great pile of stones in a nightmare, he would dream of such a pile as the Cheese-Wring. All the heaviest and largest of the seven thick slabs of which it is composed are at the top; all the lightest and smallest at the bottom. It rises perpendicularly to a height of thirty-two feet, without lateral support of any kind The fifth and sixth rocks are of immense size and thickness, and overhang fearfully, all round the four lower rocks which support them. All are perfectly irregular; the projections of one do not fit into the interstices of another; they are heaped up loosely in their extraordinary top-heavy form on slanting ground half-way down a steep hill. Look at them from whatever point you will, there is still all that is *heaviest, largest, strongest* at the summit, and all *that is lightest, smallest, weakest* at the base. When you first see the Cheese-Wring, you instinctively shrink from walking under it. Beholding the tons on tons of stone balanced to a hair's breadth on the mere fragments beneath, you think that with a pole in your hand, with one push against the top rocks, you could hurl down the hill in an instant a pile which has stood for centuries, unshaken by the fiercest hurricane that ever blew, rushing from the great void of an ocean over the naked surface of a moor. Of course, theories advanced by learned men are not wanting to explain such a phenomenon as the Cheese-Wring. Certain antiquaries have undertaken to solve this curious problem of nature in a very off-hand manner, by asserting that the rocks were heaped up as they now appear by the Druids, with the intention of astonishing their contemporaries and all posterity by a striking exhibition of their architectural skill. (If any of these antiquarian gentlemen be still living I would not recommend them to attempt a practical illustration of their theory by building miniature Cheese-Wrings out of the contents of their coal-scuttles.) The second *explanation of the extraordinary position of the rocks is* a geological explanation, and is apparently the true one. It is assumed on this latter hypothesis, that the Cheese-Wring, and



THE CHEESE-WRING.

all the adjacent masses of stone, were once covered, or nearly covered by earth, and were thus supported in an upright form; that the wear and tear of storms gradually washed away all this earth from between the rocks, down the hill, and then left such heaps of stones as were accidently complete in their balance on each other, to stand erect, and such as were not, to fall flat on the surface of the hill in all the various positions in which they now appear. Accepting this theory as the right one, it still seems strange that there should be only one Cheese-Wring on the hill—but so it is. Plenty of rocks are to be seen there piled on one another; but none of them are piled in the same extraordinary manner as the Cheese-Wring, which stands alone in its grandeur, a curiosity that even science may wonder at, a sight which is worth a visit to Cornwall, even if Cornwall presented nothing else to see."

THE LAND'S END

Is a curious rocky headland, forming the extreme westward boundary of the British coast. Mr. Collins, from whose delightful book we quote again, thus describes it—

"I have already said, that the stranger must ask his way before he can find out the particular mass of rocks, geographically entitled to the appellation of the 'Land's-End.' He may, however, easily discover when he has reached the *district* of the 'Land's-End," by two rather remarkable indications that he will meet on his road. He will observe, at some distance from the coast, an old milestone, marked 'I,' and will be informed that this is the real original first mile in England; as if all measurement of distances began strictly from the West! A little further on he will come to a house, on one wall of which he will see written in large letters, 'This is the first Inn in England;' and on the other, 'This is the last Inn in England;' as if the genuine recognised beginning, and end too, of the Island of Britain were here, and here only! Having pondered a little on the slightly exclusive view of the attributes of their locality, taken by the inhabitants, he will then be led forward, about half a mile, by his guide, will descend some cliffs, will walk out on a ridge of rocks till he can go no further; and will then be told that he is standing on the Land's End! Here, as elsewhere, there are certain 'sights' which a stranger is required to examine assiduously, as a duty if not as a pleasure, by guide-book law, rigidly administered by guides. There is, first of all, the mark of a horse's hoof, which is with great care kept *sharply modelled* (to borrow the painter's phrase), in the thin grass at the edge of the precipice. This mark commemorates the narrow escape from death of a drunken man, who, for a wager, rode a horse down the cliff, to the extreme verge of the Land's-End; where the poor animal, seeing its danger, turned in affright, reared, and fell back into the sea raging over the rocks beneath. Fool as he was, the man had just sense enough left to throw himself off in time—he tumbled on the ground, within a few inches of the precipice, and so barely saved the life which he had richly deserved to lose.

One of the curiosities of the Land's-End is a protuberance in a pile of granite at a little distance off, which bears a remote resemblance to a gigantic human face, adorned with a short beard, and which is considered quite a portrait (of all the people in the world to liken it to!) of Dr. Johnson! It is, therefore, publicly known as 'Johnson's Head!' If it can fairly be compared with any of the countenances of any remarkable characters that ever existed, it may justly be said to exhibit a violent exaggeration of the worst physiognomical peculiarities of Nero and Henry the Eighth, combined into one face."

Stretching away from the Cornwall coast, and connected with it only by a narrow track of low land, is

ST. MICHAEL'S MOUNT,

A sort of beacon hill, which rises abruptly from the sea in the form of a cone, and attains an elevation of 231 feet. Its singular situation and picturesque effect render it a most interesting object of curiosity; and it is calculated equally to attract the attention of the historian, awaken the researches of the naturalist, or employ the pencil of the painter. Its magnitude is seen in the most impressive point of view from its base, for when observed from a distance, its form appears trifling, amidst the vast expanse of waters with which it is surrounded.

A narrow neck of land, little more than a quarter of a mile in length, connects it with the main land; this natural causeway is passable at low water to foot-passengers and carriages, but at high tide is completely covered by the sea. The Mount is supposed by some writers to have been originally surrounded by a dense forest, and this idea is strengthened by the remains of trees having been discovered in its neighbourhood, at the time of an extraordinary high tide, as Borlase, the historian of Cornwall, relates in the fiftieth volume of the *Transactions of the Royal Society*, and also from its Cornish name *Carakh-ludgh en lu*, "The Grey Rock in the wood."

It is supposed to be the island called Ictis by Diodorus Siculus, and other ancient authors, from which the Gauls and other nations of the continent fetched the tin, which Cornwall was known to produce, even in those early ages. As far back as 1070 we find it the site of a priory of Benedictine monks; after the Norman Conquest, it was bestowed upon Robert, earl of Mortaigne, who made it a cell (chapel) to the Abbey of St. Michael in Normandy.

At the beginning of the fourteenth century, when the alien priories were suppressed, an exception was made in favour of St. Michael, on condition of the same tribute being paid to the English crown, as was formerly remitted to its parent abbey. In later times, when the monasteries were dissolved in the reign of Henry the Eighth, it was bestowed on Humphrey Arundel, Esq. It afterwards came into the possession, by purchase, of the St. Aubin family, to whom the buildings on the Mount at present belong. The pier, which affords protection to at least fifty sail of small vessels, being in a dilapidated state, was rebuilt in 1726, by Sir John St. Aubyn, and the small village which is built at its base was much enlarged. It is now occupied as a country seat, which is attractive only for the fine view it affords of the coast and sea, the rooms being too small for the requirements of modern fashion.

On the top of the tower, in one of the angles, is the remains of what is supposed to have been a moorstone lantern, kept, in all likelihood, by the monks, who had a tithe of the fishery, to give directions to the fishermen in dark and tempestuous weather. This is vulgularly called St. Michael's Chair, and will only admit one person to sit down in it at a time. The ascent to it is dangerous, but is sometimes foolishly attempted out of bravado. There is also a legend attached to it, which, in former days, was firmly relied on, and even now is not entirely disbelieved, namely, that whoever first sits in St. Michael's Chair after marriage, whether the husband or wife, shall, from that time forth, remain the ruler in domestic affairs.

Mountain, the curious Muse might love to gaze
On the dim record of thy early days;
Oft fancying that she heard, like the low blast,
The sound of mighty generations past.
Here the Phœnician, as remote he sailed
Along the unknown coast, exulting hailed;
And when he saw thy rocky point aspire,
Thought on his native shores, of Aradus or Tyre.

Thou only, aged mountain, dost remain!
Stern monument, amidst the deluged plain,
And fruitless the big waves thy bulwarks beat,
The big waves slow retire, and murmur at thy feet.
BOWLES.

Many of the most interesting rocky scenes are to be found along our southern and eastern coasts, where numerous chalk cliffs and limestone reefs jut out at various angles and form isolated masses, or headlands, of great boldness and beauty. Northward, in the isles of Scotland, we find fine examples of the most primitive rocks in the granite formations of Staffa and the surrounding isles; and in the cliffs of Dover and the formations of the Isle of Wight we have examples of strata more recent.

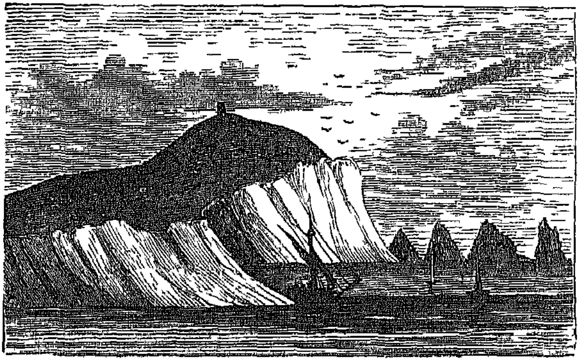
THE ISLE OF WIGHT

Is an example of the tertiary formation, and is, in fact, a disrupted mass, separated from the south coast of England, the northern part of the island being part of the Hampshire basin. The most striking and distinctive features of the Isle of Wight exist on its coasts, which present a continual succession of natural phenomena, and grand or beautiful scenery. The tourist who is favoured by fine weather, and has time enough, would do well to make the tour of the island by sea; as in that manner he will see many things that would otherwise escape him, and take in the stupendous dimensions of cliffs and rent columns with far more effect than in looking at them from above, or from the narrow line of the shore.

ALUM BAY

Presents one of the most striking scenes on this coast. On one side it is bounded by lofty precipices of chalk, of a pearly colour, broken and indented;—on the other by cliffs strangely but beautifully variegated with different colours, arising from the strata of red and yellow ochres, fuller's earth, black flints, and sands, both grey and snowy white. The white sand is valuable for the manufacture of glass and chinaware, and is exported in considerable quantities. Of the coloured sands, which are uncommonly bright and pretty, the people of the island make little chimney-piece ornaments, by putting them into phials, and so arranging and contrasting the different tints as to form fantastic designs. Alum and copperas-stones are also picked up on the shores of the bay, and exported in small quantities.

As the tourist changes his position in Alum Bay,



THE NEEDLE ROCKS

Which are five in number, vary their irregular forms to the eye in a most singular manner. From some points of view, they appear as if united in one broad rugged mass; from others, they are seen detached, and looking like old fortresses which have battered each other to pieces, or fallen into one common ruin under the weight of time and the violence of tempests. "The Needles" stand on a line with the extremity of the island, of which they were formerly a part. They are white, with a black base, and curiously streaked with black dots, from the alternate strata of flints. A traveller has remarked, that, at a distance, they look more like thimbles than needles. The only one of them to which the name of needle was at all applicable was of a cylindrical shape, thin, and above one hundred feet high, measuring from low-water mark; and this one fell down and almost entirely disappeared about sixty years ago, its base having been worn through by the continual action of the waves and tides. Seamen used to call it the "Pillar of Lot's Wife." It was the farthest from the island: its base, consisting mostly of flint, is still visible, and in stormy weather it forms a dangerous reef. From the chalky nature of this remarkable group of rocks, and of the coast of the island from which they have been detached, continual changes are taking place in their form and disposition. In some places the sea has eaten them through, and formed large and irregular archways; in others it has so washed away their sides that they look rather like walls than solid rocks; while deep caverns have been formed in the chalky cliffs of the island, which fall in from time to time, and gradually diminish the island in that direction. At no distant period the present Needles, or rocks, will have wholly disappeared; but new ones will be formed out of the western end or projecting point of the Isle of Wight, which, already extremely narrow, will be insulated like the Needles, when the sea, at work on both sides, shall have quite broken through the thin partition. Whilst standing on this perilous part of the island, in 1811, M. Simond says, "We observed, with some terror, a long crack along the margin of the cliff, cutting off a slice of the downs (sheep were quietly feeding upon it) of full one acre. This slice has settled down already two or three feet, and must soon fall. The next heavy rain, or frost, or high wind, may detach it,—and down it slips six hundred and sixty feet perpendicular! We had landed yesterday on the flinty beach precisely under this cliff, twice as high as those of Dover, and more exposed to an open sea."

On turning the Needles and the most westerly point of the Isle of Wight, into Scratchell's Bay, the rough sublimity of the cliffs continues, and there commences a series of caves that end at

FRESHWATER GATE.

The chalk cliffs are perhaps unequalled in the world;—they rise upwards of six hundred feet above the level of the sea, perpendicularly in some places, and overhanging, in an alarming manner, in others. They are for the most part perfectly white, with narrow streaks of black flint, much inclined to the horizon, like the flint streaks of the Needles. The several strata form rough projecting shelves, that serve as lodgments for the sea-fowl and other birds, that congregate here in prodigious numbers. There are cormorants, gulls, puffins, razor-bills, willcocks, Cornish choughs, wild pigeons, daws, starlings, &c., that in certain seasons sit in tiers, the one above the other, almost covering the entire face of the cliffs. At the report of a gun they scream, fly out, and almost darken the sky with their countless wings. At times, flights of these birds skim the air in endless circles, and wheel round the head of the tourist on wings that seem without motion, and with a cry like a horse-laugh. One or two species remain all the year round, but most of them are migratory, coming in May, when they lay their eggs in the rocks, and taking their departure about the middle of

August, after which they are seen no more till the next breeding-season. During their stay, they are not left undisturbed in their seemingly inaccessible retreats Unable to get at them from below by climbing, the islanders reach them from above by descending the perpendicular cliffs, in much the same perilous manner as is practised by the Norwegians and the hardy natives of the Feroe Islands. They drive a large stake or iron bar into the top of the cliff ;—to this stake or bar they fasten a long rope, at the other end of which there is a stick put crosswise for the adventurer to sit upon, or support himself by ; and with this simple apparatus he lets himself down the front of the horrid precipice. If his object is to secure eggs, he halloos as he descends, to scare the birds away ; but when he wishes to obtain feathers and the birds themselves, he goes to work in silence, and either catches them in their nests or knocks them down with a stick as they fly out of their holes. The soft feathers of the birds are of value, and find a ready market with upholsterers ; their flesh, which is rank and fishy, is bought by the fishermen, who cut it up and use it for their crab-pots and other baits. Some of the eggs are said to be very good eating. Worsley says that, in his time a dozen birds generally yielded one pound weight of soft feathers, which were sold for eightpence the pound.

Standing on the summit of these tremendous cliffs, Shakspeare might have said, with stricter accuracy than he did of those of Dover,

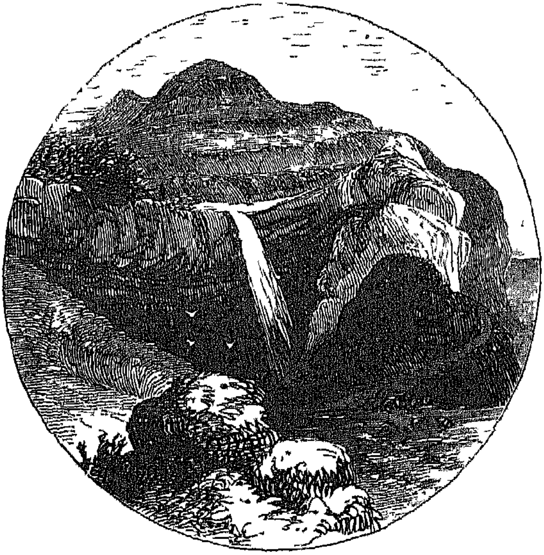
"The murmuring surge,
That on the unnumber'd idle pebbles chafes,
Cannot be heard so high."

Here, too, grows samphire, in fine green tufts ; and those who gather it, "perilous trade," are let down by a rope from above, in the same manner as the fowlers. The pebbles below, over which the sea rolls, are black and shiny, being mainly flints loosened or dissolved from their beds in the chalk, and broken and polished by the friction of ages, produced by the never-resting tides and waves. The water at the foot of the cliffs is so clear, that one can see, many fathoms deep, to the bottom of it.

We are now at the back of the island. Rowing under Freshwater Cliffs, the tourist may visit

NEPTUNE'S CAVES,

The larger of which is two hundred feet deep ;—the Bay of Watcomb, where the scenery is as bold and almost as curious as at Alum Bay,—and then Freshwater Cave, which is about one hundred and twenty feet in depth, and, taken altogether, the most romantic of these caverns. A rude fantastic arch, about thirty feet high, and of the same width, and two lateral arches of smaller dimensions, separated from each other by a thin rocky column, give admittance to this wild and deep recess. Looking seaward, from the interior of the cave, the view is at once curious and beautiful. Through the main arch a glorious expanse of ocean presents itself; and looking through the side arches, which are of an arrow-head shape at top, you see part of the rocky coast of the Wight as through the Gothic windows of a cathedral.



BLACK-GANG CHINE.

A little farther on, a detached arched rock stands boldly out into Freshwater Bay, its rough edges generally crowded with screaming wild-fowl. It is now nearly six hundred feet from the cliffs of the island, of which it once formed a solid part. In the centre of this bay is a creek, called Freshwater Gate, with a huge columnar rock, rising out of the sea immediately before its mouth. It is just behind this creek that the Yar rises, which river, running due north, right across this end of the island, falls, as we have said, into the Solent Strait at Yarmouth. In the time of Queen Elizabeth an earthern redoubt was thrown up on the narrow isthmus that separates the sea from the river—a bit of fortification that cost the sum of £651 11s. 2½d. precisely. Near to this point is Compton Bay, where there is a delightful walk on a broad margin of silvery sand.

On the coast of the Wight, at the foot of the tower of St. Catherine's Hill, occurs one of the finest of the chines or ravines, called

BLACK-GANG CHINE.

This gloomy fissure penetrates far into the cliffs that form the southern point of the island. At the upper part of it, a stream falls over a ledge of rocks that is nearly eighty feet high. At certain seasons, after long and heavy rains, this is a fine cataract; but, during the fine summers, the scanty stream is retained behind the rocky ledge, or merely trickles over the brow of the precipice. Without this adjunct the Chine is wild, picturesque, lonely, and sublime. It is grand enough to have pleased the heart of Salvator Rosa, or to have formed a subject for the pen of Scott. In some places the cliffs on either side are nearly five hundred feet high.

Another interesting scene is

THE UNDERCLIFF,

Where fine examples of land-slips are to be seen. Here a slip, of about six miles long and from a quarter to half a mile in breadth, seems to have settled down and slipped towards the sea, exhibiting a jumble of rocks overturned and broken—mounds of earth—deep hollows—and numerous springs, forming falls of water, collecting into pools, and hurrying to the sea. The cliffs that immediately face the sea vary from sixty to one hundred feet in height, and upon these runs the long irregular platform or terrace, which is backed on the north by a bold abrupt steep—a wall of rock, rising two or three hundred feet higher. These upper or land cliffs, are composed of horizontal beds of sandstone; being precisely the same material as is seen on the broken surface below. It is every way evident that the sunken tract, or "Undercliff," was formerly a continuation of the high cliff. "The crisis of this part of the Undercliff," says M. Simond, "is evidently of no recent date, and the earth has had time to grow young again; for contrary to the laws of organic life, inert *matter* loses with age its original deformity and barrenness, and is indebted to the very dissolution for its beauty and fecundity."

SHAKSPERE'S CLIFF

Is well known as one of the most prominent points of the English coast at Dover. It derives its name of "Shakspere's Cliff" from a reference in "King Lear." In the first scene of the fourth act of that tragedy, the blind *Glo'ster*, while wandering on the heath, having met his son *Edgar*, who does not discover himself, asks him, "Dost thou know Dover?" and when the latter answers, "Ay, Master," rejoins

> "There is a cliff, *whose high and bending head*
> Looks fearfully in the confined deep;
> Bring me but to the very brim of it.
> From that place
> I shall no leading need."

From the first two of these lines the particular cliff here depicted has probably been fixed upon as that which the poet must have had in his mind. The summit of this portion of the chalky battlement formerly overhung its base, and, as *Glo'ster* forcibly expresses it, looked fearfully *in* (not *on*, as it has often been printed,) the confined deep. Shakspere's Cliff, however, has now lost this distinguishing peculiarity. So many portions have successively fallen from it that, instead of bending over the sea, it now retires at the top towards the land. Another effect has been, that its height is considerably diminished, and the look down is not now so fearful as it must have been in Shakspere's days.

Having led his father some way farther on, *Edgar* at length pretends to have brought him to the neighbourhood of the Cliff. He then exclaims—

> "Come on, Sir, here's the place:—Stand still; how fearful
> And dizzy 'tis to cast one's eyes so low!
> The crows and choughs that wing the midway air
> Show scarce so gross as beetles: half way down
> Hangs one that gathers samphire; *dreadful trade!*
> Methinks, he seems no bigger than his head;
> The fishermen that walk upon the beach
> Appear like mice; and yon tall anchoring bark
> Diminish'd to her cock; her cock, a buoy

Almost too small for sight: the murmuring surge,
That on the unnumber'd idle pebbles chafes,
Cannot be heard so high. I'll look no more,
Lest my brain turn, and the deficient sight
Topple down headlong."

The busy sounds of railway traffic now haunt the scene so lonely in the days of Shakspere. The very cliff is changed in aspect by the process of blasting resorted to, to bring it into a condition suited to the purpose of railway enterprise; and the roar of the engine and the shriek of the guard's whistle mingle with the chafing of the surf, the first telling of to-day, with its life and bustle and commercial greatness, the last murmuring, as it murmured of old, when the great poet described it as

"The murmuring surge,
That on the unnumber'd pebbles chafes,"

and forming a constant requiem for his memory and genius. The following beautiful lines, by Mrs. Hemans, convey a pleasing impression of the Dover cliffs—

"Rocks of my country! let the clouds
Your crested heights array;
And rise ye like a fortress proud,
Above the surge and spray!

"My spirit greets you as ye stand,
Breasting the billows' foam;
Oh, thus for ever guard the land,
The severed land of home!

"I have left sunny skies behind
Lighting up classic shrines,
And music in the southern wind,
And sunshine on the vines.

"The breathings of the myrtle flowers
Have floated o'er my way,
The pilgrim's voice at vesper hours,
Hath soothed me with its lay.

"The isles of Greece, the hills of Spain,
The purple heavens of Rome—
Yes, all are glorious! yet again
I bless thee, land of home!

"For thine, the Sabbath peace, my land;
And thine the guarded hearth,
And there the dead, the noble band,
That makes thee holy earth.

"Their voices meet me in the breeze
Their steps are on thy plains;
Their names by old majestic trees,
Are whispered round thy fanes:—

"Their blood hath mingled with the tide
Of thine exulting sea;—
Oh, be it still a joy, a pride,
To live and die for thee!"

A few specimens of columnar rocks may be worthily cited in this chapter as wonderful things. The wonders of Staffa and the Cave of Fingal, have been already described as among the chief marvels of this class, and the Giant's Causeway, so remarkable an example of volcanic energy, has figured in its place with caves and grottos.

THE GROTTE DES FROMAGES,

Or Grotto of Cheeses, is situate at Bertrich-Baden, and is a strange example of basaltic structure. It consists of a mass of basalt which has evidently been ejected in a state of fusion, and has cooled down and crystallised into these cheese-like forms. Numerous pillars of these piled-up blocks sustain a heavy roof above, and form an arcade or corridor, beyond which stretch other rows of columns, some verging off in different directions, and others proceeding parallel with the first, and forming a perfect labyrinth of rocky wonder.

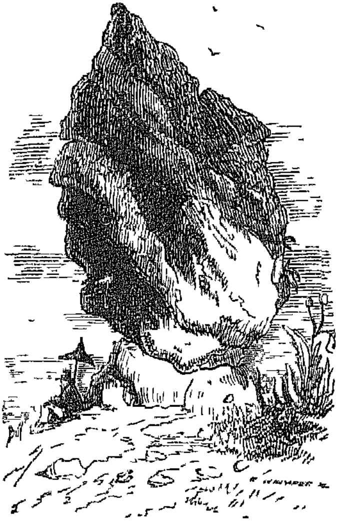
THE SKUIR OF EGG

Is a lofty promontory in the Isle of Egg, on the west coast of Scotland. It is one of the Hebrides, a group famous for the visit of Dr. Johnson, and the account rendered by Boswell of the trip. It rises 1339 feet above the sea, and the pitchstone, which is intensely black, with crystals of glassy felspar, forming a substance of great beauty, is arranged in columns, which exceed in grandeur and in picturesque effect those of Staffa.

A pointed flinty rock, all bare and black,
Grew gibbous from behind the mountain's back;
Owls, ravens, all ill omens of the night,
Here built their nests, and hither wing'd their flight.
VIRGIL.

"The promontory," says Dr. Macculloch, "rests on a bed of compact grey limestone, approaching to a stone marl. Masses of bituminised wood, penetrated with carbonate of lime, are found in the marl stratum, not at all flattened. Portions of trunks of trees, retaining their original shape, but petrified, are found in the same stratum; the rifts are filled with chalcedony, approaching in aspect to semi-opal. The columns on this island are both perpendicular and inclined, and some of them are bent or curved.

We shall conclude this paper by a notice of a celebrated



ROCK ON THE NIGER,

which crowns an eminence overlooking that "river of ages,"

> Whose shores have rung with Clarkson's melting tones,
> When thousands wept to hear of slavery's groans.

It is a huge mass of limestone, somewhat diamond shaped, with a sharp wedgelike peak. Its size is equal to one of our city churches, and its weight to many thousand tons. Its position affords a fine view of the current of the stream with its palm-shaded banks and rising hills, dotted with negro villages, and backed by the unexplored wilderness of modern African enterprise. Climbing the hill from the village which lies a few miles below it, the traveller reaches a soft mound of verdure, dotted here and there with sedges in gay bloom; and resting in the shade of the rock itself, looks out upon the dark river, and calls to mind the antiquity of its name and history, reaching back to a time of primitive simplicity and ending in the horrors of the slavery of to-day. Under the shade of this rock Mungo Park may many times have sat; and from its base the Landers may have formed plans as to their future progress; and to many a future traveller it may yet be an object of admiration and a place of repose, while it is at the same time a memento of the work which must yet be accomplished before the interior of Africa shall yield up its history to the European, or the river itself tell the secret of its source.

MOUNTAIN PASSES.

ALL mountain chains are marked by depressions, or chasms, extending for long distances and forming natural pathways through them. The base of these roadways is at a great elevation above the general surface of the earth; although from the great height of the precipices on either side they seem to be below it, and the traveller in passing through them makes his way amid dark glens, over rugged defiles, and below projecting crags and overhanging woods, which prevent him from gaining any view of the surrounding scenery. These pathways are known by the general name of gates, or passes, though they have local names, such as *cols* applied to those in the Alps, *ports* to those in the Pyrenees, and *gaps* to those which occur in the United States. In all situations of this kind, scenes of great natural beauty and grandeur are found tinged with a solemnity derived from their stupendousness, and from the seclusion amid which they exist. To natural appearances like these, may be ascribed those superstitious feelings, and that gravity of character, which is usually apparent among the inhabitants of mountainous regions.

Passes are, as might be expected, intimately associated with the history of the countries in which they lie. They are the tracks which were followed in the migrations of the hordes of antiquity, and there the denizens have met the armies of the invaders. They are more especially connected with the wars of a people; and scarcely an important natural pass but has its legend of some fierce fray, from the time of the fight of Thermopylæ, downward. From classic times till now, the name of Thermopylæ has been associated with bravery, valour, and patriotism; and travellers make pilgrimages to the spot hallowed by the remembrance that there a handful of the bravest sons of Greece met the full force of the Persian armies—breasted the wide-spread torrent of war, and only suffered it to roll on when, sinking beneath their wounds into the arms of death, resistance was no longer possible. Following the description of the historian Livy, we can yet trace the route pursued by the myriads of Xerxes. On they came through the deep ravine of Tempê, which running along the side of Olympus, affords a passage for the river Pineus to the sea. Slowly the long array wound between the precipitous cliffs of bluish grey marble, which, rent asunder by the convulsions of an earthquake, rear their jagged rocks to the height of eight hundred feet on either side. Painfully they forced their way through the stunted trees and brushwood, which springing up wherever a patch of earth presented itself, rendered the passage difficult, till at length they came to "The pass of the Warm Springs"—the narrow defile of Thermopylæ. On the one side were the insurmountable precipices, on the other the marsh and the sea, and in the midst the firm ground some hundred yards wide, where stood the Spartan band headed by their king. Of the hesitation of the multitude before the few—of the fierce onslaught and the fiercer fight—of the fall of the heroes before the forest of spears which they confronted, others more eloquent have written, and we scarcely need to repeat the tale; suffice it to say, that there is Thermopylæ still as it was when Livy wrote—there the warm springs, from which it derived its name—there the wall built by the Phocians, and there, too, the mound under which lie what remains of the heroic Lacedemonians, whose memory hallows the spot to all those who can appreciate unshrinking devotion.

The history of the passes of Switzerland is peculiarly fertile in recollections, extremely and interesting to the historical student. It was through the pass of the Great St. Bernard that Hannibal led the Carthaginian troops to the attack upon Rome. The same pass was made the high road of the Roman legions when they invaded the territories of the Switzers, and was made practicable for cars, by the orders of Augustus. When Pepin invaded the Lombards, he led his Franks along the same track; and when the Alexander of the modern world, Napoleon, unfurled the banners of France upon the sunny plains of Italy, that was the passage which, by the union of the greatest skill and daring, he made available for the passage of a modern army, with its artillery and cumbrous *materiel*.

A thousand other tales and traditions abound among the peasantry, who point out in these defiles, the natural fortifications of the country, the localities of long past events. Here the Austrian poured through his dark masses—there they retired; here the Burgundian chivalry advanced, in all the pride and panoply of mediæval war, against half-armed mountaineers—there they fled in confusion from the defeat they met with at the hands of peasants, determined to die or be free.

When Roman ambition, seeking to compass the whole world, spread forth its arms into Asia, it was in the defiles of the Caucasus that they experienced the greatest loss and met with the most determined opposition. So great was the importance attached to these gates, which offered an inlet, or barred the entrance to a country, that difficult as they were in themselves their natural strength was not trusted to, but they were defended in a way which is thus described by Essing. "Each pass was closed with large beams of wood, pointed with iron. In the midst of the narrow valley flowed a river. The southern extremity was protected by a castle built on a high rock. This defence was to prevent incursions from people from the North." Three great passes of the Caucasus thus fortified, are spoken of by classical writers. The Pyle Sarmatæ, the Pyle Albania, and the Pyle Caspia. Of these the former, which is the Porta Caucasia of Strabo, and now called the valley of the river Terek, is the most important; and on the spot where the legionaries of Rome battled with the mountaineers, the troops of Russia are now struggling with the indomitable Circassians.

In the north and west of our own island, where mountainous regions occur, the ravines, which give access to the country beyond them, are still remembered as the scene of many a strife between the civilized Saxon, and the kilted Gael of the Scotch highlands, and the Celtic inhabitants of Wales. A beautiful description of a battle in a highland pass, will be found in Sir Walter Scott's "Lady of the Lake;" and the old chroniclers abound in accounts of the successes and defeats of the Lords of the Marches in the Welsh defiles.

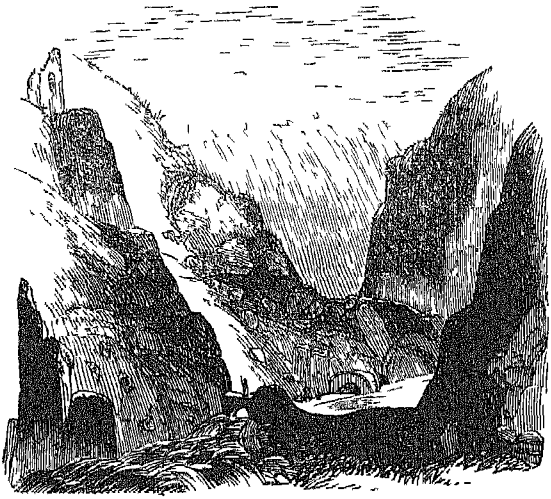
The great range of mountains which bound British India on the north, are intimately blended with the history of Greece, and with our own records. Through their ravines Alexander, after overthrowing Persian power, forced his way to conquests upon the plains of Hindostan; and the Khyber Pass has acquired a melancholy fame in these times, from the fact that there, a whole British army, in the retreat from Cabul, dispirited, fatigued, without food, betrayed, and benumbed by the cold, fell beneath the attacks of a barbarous enemy, dyeing the snows with their blood, and leaving their bodies to mark the path by which their comrades advanced to avenge their fate. But victorious as those who came after them were, their success hardly effaced the disgrace of former defeat, and was powerless to dry the tears for those who so ignobly fell.

The mountain ranges of the great American continents are the most barren of any others, in associations interesting to those who love to mingle natural facts with the occurrences of the past. They tower up to an altitude far beyond that attained by the highest of the European peaks; they are more varied in their vegetation, products and climate; they have valleys broader, ravines more rugged, and defiles more difficult, dangerous, and awe-inspiring, than are elsewhere to be found; but they mingle less with the known history of the human race. The deficiency lies, probably, in our want of knowledge, of the bygone time of America. Before Columbus had piloted his trackless way across the ocean — before the Spaniard had set his foot upon the soil of the western world—when Montezuma still reigned in the halls of his ancestors—they too, had their history, doubtless, of the passage of tribes, of the war-path of armies, of strife and slaughter,—but those, if they ever existed, are lost to us. Almost all we know of them is, that Cortez and his followers, listening to native traditions, deemed that beyond and among them, to be reached by paths difficult to find, and hazardous to tread, was *a land teeming with gold*; *tales, which led our Raleigh to search for an Eldorado.* These have since been regarded as either the inventions of the cunning, or dreams of the credulous; but the gold diggings upon the banks of the Sacramento have verified them, and the passes of the Rocky Mountains now witness many a cavalcade of gold-seekers toiling on where, for centuries, the foot of man has never trod.

After thus glancing at the history of passes and the associations which hover about them, we will proceed to describe some of the principal ones. Beginning with Asia, the cradle of the human race, and that particular portion of it which some ethnologists point to as the precise locality where man first appeared, we will take a glimpse of that old defile just alluded to—the Pylæ Sarmatæ of Pliny, and now the Terek Pass. The river from which it takes its name, flows through the centre to the northward, a foaming, rapid, turbid torrent, and by its side is the artificial road leading to Georgia, which, in 1804, the Emperor Alexander of Russia caused to be made. By the side of this road the frowning precipices rise up from the roaring torrent to the height of many thousand feet; they approach so closely on either side, that daylight never penetrates down the deep chasm. From their perpendicular surfaces huge rocks, of thousands of tons in weight, project so as occasionally entirely to overarch the path, and those who pass through, in the dim twilight which pervades the scene, look up with dread, lest one of these monstrous masses loosening from its hold on the face of the rock, should come thundering down, bringing with it destruction to those below. This fear is not entirely a causeless one, for now and then. particularly after winter, when the frosts have eaten into the rock and the sudden thaw comes on, those tremendous crags breaking away, fall with a noise louder than the loudest thunder, beating the river from its channel, crushing the passers-by, and causing the valley to be flooded for miles. At some distance up the pass, about a day's march from its entrance upon the European side, the Russians have established a permanent military post, in order to keep open the communication so liable to be interrupted by the sudden forays of the Circassian mountaineers. Here the defile widens, and presents an aspect of singular grandeur and magnificence. At the point from which our illustration of the Darial is taken, the river runs comparatively smooth, except when swelled by the waters which accumulate at the breaking up of winter; the rocks receding to some distance on each side assume every variety of form, and reach up to about four thousand feet, while in the distance, high above all, towers the gigantic Kaisbeck, which hides its head among the clouds, at an elevation of four thousand feet above the level where the region of perpetual snow commences. It is at this spot that some of the fiercest combats between the indomitable mountaineers and the Cossacks have taken place.

The mountains of the Himalaya range show us nature in her wildest and most terrific moods; though the paths across them are tolerably well known, in consequence of their being traversed by crowds of merchants from India and Tartary in the course of the year, yet they are seldom passed without loss of life. As the track of the caravan of the desert is marked by the whitened bones of those to whom the peril of the journey has proved fatal, so in the higher parts of the passes of the Himalaya, the corpse of some traveller marks the road. It is not only that the passage is difficult by reason of visible obstacles or the ruggedness of the rocks, but vitality seems to fail in an atmosphere where the slightest exertion produces pain. One of these passes, high above which the rocks rise, requires the traveller to ascend to an elevation *3000 feet above the summit of Mount Blanc, the monarch of* the Alps. This is the Mannering Pass, the passage of which was accomplished by Captain Gerard, who thus describes its features and the pain and peril of the achievement. "The river Darboony was lost among the fields of snow and ice by which it was generated; the whole space on every side was floored by ice, half hid under stones and rubbish. In some places the snow is of an incredible thickness, and lies in heaps. Having accumulated for years together, it separates by its gravity, and carries desolation in its route. Nowhere, in all my travels, have I observed such enormous bodies of snow and ice, or altogether such a scene. So rapid and incessant is the progress of destruction here, that piles of stones are erected to guide the traveller, since the pathway is often obliterated in a few days by fresh showers of splinters. Our elevation was now upwards of 16,000 feet, although we had but ascended in company with the river. Here only began our toils; we scaled the slope of the mountain very slowly; respiration was laborious, and we felt exhausted at every step. The crest of the pass was not visible, and we saw no limit to our exertions. The road inclined to an angle of 30°. Vast benches of limestone-like marble were passed under; the projections frowned over us in new and horrid shapes! Our situation was different from any thing we had yet experienced; *it cannot be described. Long before we got up our respiration* became hurried and oppressive, and compelled us to sit down every few yards; then only could we inhale a sufficient supply of air. The least motion was accompanied by debility and mental dejection; and thus we laboured on for two miles. The last half mile was over the perpetual snow, sinking with the foot from three to twelve inches, the fresh covering of the former night. The direct road leads to the centre of the gap, where the snow is very deep and treacherous; and we made a circuit to the right to avoid the danger of being swallowed up, where often shepherds and their flocks have sunk never to rise. The day was cloudy, and a strong wind half froze us. The rocks were falling on all sides, and we narrowly escaped destruction. I myself twice saw large blocks of rock pass with dreadful velocity through the line of people, and between two of them, not four feet apart. At half-past two I reached the summit."

The mountains of South America are equally grand and majestic with those of India; and the passes by which they are intersected, while presenting the same terrific features have a greater variety of aspects. This is caused partly by the fact that in the ascent of the mountains and the passage of the intermediate table-lands there are three permanent zones of temperature. At the base the heat is that of the torrid zone; in the middle there is the temperate heat, and toward the top the arctic regions. In all of these there are none of those salutary variations which, with the recurrence of the seasons, distinguish other climates; but in the upper parts a cold, constant and humid, rather than excessive; in the middle a mild warmth like that of a hot-house, and on the plains the burning heat of the tropics. The vegetation as the passes are mounted corresponds with these temperatures; first comes the palm, the cactus, and the flowering jessamine; then the cinchona and the arborescent fern. To these succeeds flower trees, such as the Passion-flower tree, as lofty as the oaks of northern regions, and green mosses forming a carpet of beautiful verdure. Afterwards, at an elevation above the



THE DARIAL.

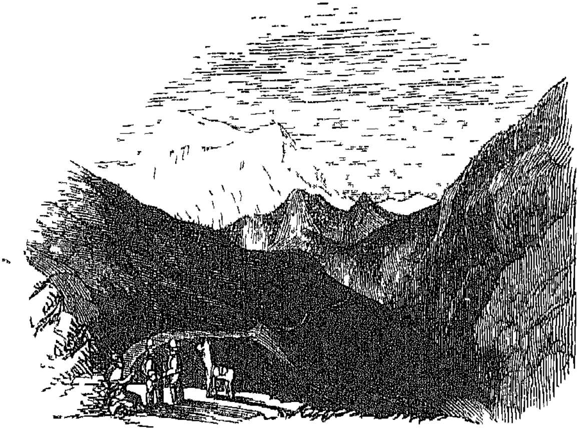
level of the sea of more than a mile, oaks make their appearance. Beyond those there are stunted broad spreading shrubs, and the beautiful flowers of the calceolaria. Higher up still a broad zone, varying in width from a mile and a-half to three miles, produces alpine plants, and above all, from the height of about 18,000 feet, the lichens cover the rocks.

The glaciers common to the Himalayas and the Alps do not belong to the ranges of the Andes, probably on account of the proximity to the equator, but there are other perils which make up for their absence. Across are chasms, sometimes crossed by a rude swinging bridge of ropes formed from twisted leaves, which disclose gulfs penetrating down below the level of the plain, into which the bravest cannot look without a thrill of fear creeping coldly through his veins. Some idea of their depth and size may be formed when we say, that the highest of the Alpine mountains might be placed in them without their summits reaching to the top. At times the mountain torrents break forth with resistless force, carrying all before their impetuous rush; and ever and anon some vast volcano belches forth its fire and smoke, and showers of heated stones. Perhaps nowhere so constantly as in the Andes, are there found such extensive traces of volcanic action. All the mountains in fact seem to owe their origin to that cause, and they may be generally divided into three kinds. Those which are truncated cones being immense extinct craters; those in which the sides of the tops have fallen in, leaving gigantic rugged peaks; and last, those which, like the gigantic Chimborazo, rise grandly into the clouds, like a vast dome. An intense sensation of awe is felt among these scenes even by those who have long been accustomed to mountainous countries. Condamine, speaking of his passage through the mountains of Peru, says, "Accustomed during seven years to mountains wrapt in clouds, I was lost in admiration." Sir Edmund Temple, speaking of the Ilimani, in the State of Bolivia (or perhaps, considering how rapidly names and territories change in South America, what *was* the state of Bolivia), is still more enthusiastic. He says, "Day gently broke, and the tops of distant mountains glittered in the early beams. The sun then rose, or rather rushed, upon the silent world, in a full blazing flood of morning splendour; and at the same moment the stupendous Ilimani, the giant of the Andes, in all the pomp of mountain majesty, burst upon my view. My first feeling was a sensation of delight, with an expansion of soul producing positive rapture. Never before did I feel myself endowed with equal energy, or experience such an elevation of sentiment. Never did I feel myself less, so quickly did that sentiment subside into devout rapture. Admiration, reverence, and awe, with a consciousness of human inferiority, were the mingled feelings of my heart in contemplating this terrestrial manifestation of the glory of God. Here, I exclaimed with fervour and delight, here do I behold the sublime and the beautiful, spontaneously produced in the great page of Nature by the providence and omnipotence of Nature's God. Unprepared as I was at the time, besides being full thirty miles distant, it was altogether unexpected; and the glare of magnificence in which it so suddenly stood, and to appearance so stately, absolutely surpassing imagination itself, occasioned, in a strong degree, those sensations which a scene so truly imposing, in the midst of solitary grandeur, was well calculated to inspire." The words of the great philosopher Humboldt are equally impressive. He speaks of the deep ravines, as places "so wild as to fill the mind with fear and admiration;" and continues, "they are formed by vast rents, clothed with a vigorous vegetation, and of such a depth that Vesuvius might be placed in them without overtopping the nearest heights."

The difficulty of passing the central chain is immense, except in some places where artificial causeways have been constructed. One of these crosses the bosom of Assuay, at a height nearly equal to that of the summit of Mont Blanc. It was formed by the ancient Incas of Peru, before a white man had set his foot upon the shores of the New World, and is described by Humboldt as being lined with freestone, and equal to the finest Roman roads. Part of it is now in ruins; but Indian traditions ascribe to it a length across some of the highest parts of the Andes, of one thousand three hundred miles; and Humboldt observed signs of its continuance at three hundred and sixty miles from the spot where it first attracted his attention. In and about this celebrated pass, are many evidences of the high degree of civilization to which the Peruvians had attained, before the coming of the Spaniards. At the height of more than four thousand yards are the remains of an ancient palace, and near to it a Peruvian fortress, with a house in the centre. The remains of edifices around show that there was once accommodation for a small army there; and stations remarkable for their symmetrical form and solidity were built at definite distances, showing the care with which the road was kept open. Where however the labour of man has not smoothed the ruggedness of the way, travelling is both slow and dangerous. Indeed, some of the mountain paths have never, so far as evidence goes, been entirely explored—that for example leading to the summit of Chimborazo. Humboldt and others ascended nineteen thousand three hundred feet, or about eight hundred feet less than the highest point of the Himalayan pass, which Captain Gerard made his way through. There, however, they found further progress impossible; a vast chasm, five hundred feet wide, yawned before them, and beyond, the rocks still rose above them to the height of two thousand one hundred and forty feet more. So severe was the cold that respiration was difficult, and blood oozed from the eyes, lips, and gums, of the persons composing the party. The pass of Gouanacas, which is frequently traversed, is for the space of two Spanish miles covered with the bones of travellers, who have perished in it; but the pass of Quindiu is the most difficult in the Andes. "It lies through a thick uninhabited forest, which cannot be traversed, even in the finest weather, in less than ten or twelve days. Travellers are obliged to furnish themselves with a month's provisions, as it often happens, from the melting of the snow, and the sudden swell of the torrents, that it is impossible to descend in any direction. The summit of the pass called *Garito del Paramo*, is eleven thousand four hundred and ninety-nine feet above the level of the sea. From the foot of the mountain to the summit of the pass, the ascent is eight thousand three hundred feet, in a perpendicular direction. The pathway is only from twelve to sixteen inches wide, and in several places has the appearance of a deep gallery cut in the rock and open to the sky. Along these crevices, which are full of mud, the traveller is frequently obliged to grope his way in the dark, shrubs, overgrowing the narrow opening above, and excluding the light. The oxen, which are used to carry burdens, force their way through with difficulty; and if travellers meet in the narrow gulleys, one must either turn back or clamber up the precipice and hang by the shrubs, while the other passes by. Riding on mules is totally impossible, and people in easy circumstances are carried in a kind of chair, fastened to the back of a man. Mulattos, generally, and sometimes whites, fill the office of bearers, which seems to be a trade with 'vested interests;' for when the government at one time entertained the project of improving the road, the *carqueros*, as the carriers are called, remonstrated so clamorously, that the idea was abandoned, for fear of causing an outbreak."

The ancient Peruvians used the Llama, an animal about the size of the stag, as a beast of burden, in the passes. The Llama when wild, inhabits the highest and coldest parts of the mountains in numerous herds. It somewhat resembles the camel in form, and has many of the habits of "the ship of the desert," as also its power of abstaining from water for several days. When caught and tamed it is capable of carrying a load of two hundred pounds weight, with which it will travel about sixteen miles a day, treading the rugged paths and descending precipices with ease and safety. Its flesh furnishes food resembling mutton in taste; and old naturalists, mistaking it for a member of the sheep species, mention it under the title of *ovis Peruvianis.*

The accompanying engraving represents



THE PASS OF LA VINDA,

One of the most beautiful of the mountain paths of America, and abounding in features such as have been already described.

Among the passes of Switzerland, one of the best known is that of St. Bernard, famous in history as the passage of the Roman and Frankish armies, and in later times of Napoleon, in the year 1800. It is also well known as the site of the famous hospice of St. Bernard, the most elevated habitation in Europe, the monks, of which, assisted by thier noble breed of dogs, have so often rescued travellers from the dangers of the region of snow and ice. It leads from Martigny and the villages of St. Pierre and Liedes, in the Valais to St. Remy, in Piedmont, and in some parts is impassable for carriages. The most elevated part forms a long and narrow valley, at the bottom of which is a lake, and the height above the level of the sea, is computed at about 8000 feet; not half the height of the pass in the Himalayas we have already described. The lake is for some nine months in the year covered with a thick sheet of ice; at one end stands the hospice, and at the other is a small level plain, where the Romans had a house of refuge, and a temple dedicated to Jove, from which came the ancient name *Mont Jovis.* Above the hospice, the rocks covered with perpetual snow, rise to the height of more than 4000 feet.

Chroniclers are divided in opinion as to the origin of the hospice. The general tradition assigns its erection to St. Bernard, in the year 962, but it is certain that some institution of the kind was there long before that time. Others think that the Roman foundation was rebuilt upon by the early saint, and christened after him; while a few believe that the name was bestowed at an earlier date, and that it is owing, not a saint but to a soldier—to Bernhard, the uncle of Charlemagne, who led his armies by that route against Astolphus, the last but one of the Lombard sovereigns of Upper Italy. Whichever may be the true account, there stands the hospital, in the heart of the hoary mountain, in an atmosphere scarcely fitted to sustain life, and there the devoted monks tend and succour all who may need their assistance. To the honour of all be it recorded, that here religious animosities cease in the presence of a public benefit, and the Protestant Swiss and the Catholic Italians contribute with equal readiness and goodwill to the maintenance of the benevolent and useful institution.

The chief pass of the Lepontian Alps is that of St. Gothard, leading from Bellinzona, on the Italian side, through Val Levantine to Altorf, and the Lake of the Four Cantons in Switzerland. The chain of mountains through which this passage leads is one of the most remarkable in the Alps. Though it bears the general name of St. Gothard, there are, in reality, several mountain peaks, each having its own proper designation; those on the east are Surecha, Sella, and Prosa; on the west Fiendo, Locendro and Petina; while on the south are the bare rocks of the Val Maggia. This spot is the mother of rivers. No other locality in Europe contains the sources of so many splendid streams. From hence the Reuss flows northward, the Rhine eastward, the Rhone westward, and the Tesserio southward. Though, till lately, only a mule road, it has been probably, from the smallness of its elevation of 5890 feet, a great passage for traffic. A carriage road across it has recently been completed, and a more judicious spot could not have been selected; at no other place in the chain could a straight road, at right angles with the mountain range, have been formed.

Among the many great and difficult works performed by Napoleon, was the making of the passage across the Simplon. It was planned in 1801, and finished, in spite of the greatest engineering difficulties, in 1805. Where was formerly a scarcely passable mountain track was made a magnificent road twenty-nine feet wide, with bridges spanning the chasms and tunnels penetrating the hills. Though it gains an elevation of about 6600 feet, its rise and fall is only an inch and a quarter per yard, an inclination which does not render it necessary to drag the wheels of the heaviest carriages. The bridges are substantial erections, and the six tunnels are as wide as the roadway and 30 feet high; the largest is about 500 feet. Running as this roadway does between steep and perpendicular rocks, in the midst of a mountainous district, it is exposed to great dilapidations from the falling of rocks and avalanches, and the swelling of torrents which damage or carry away the bridges and choke up the path, and an expense of some 5000*l.* or 6000*l.* a year is necessary to keep it open and in repair.

Another remarkable artificial pass which is more curious, but neither so well known nor of such magnitude as that of the Simplon, is that of Gemmi, near the baths of Leuk. The name is a corruption of the Latin word *Gemini*, applied in consequence of the twin-like appearance of the two topmost mountain peaks. The lake of Daubo, about a mile and a half in length and three-quarters in breadth, is at the summit of the pass. This lake is fed by two immense glaciers descending from the peaks of Stunbel and Rolgli, and it is remarkable from the fact, that it has no apparent outlet. As it is the basin into which several streams flow, it is probable that from its elevation of 7400 feet, its waters descend through some subterranean channel to the river Dala, one of the tributaries of the Rhone. The artificial road leads from Kondersteg, in the Canton of Berne, to the baths of Leuk in the Haut Valais. These baths are celebrated in Switzerland for their efficacy in cutaneous disorders, and are much frequented. There are not, however, many luxuries to be obtained, for the valley in which the springs are situated is almost inaccessible; it is situated at the height of 5000 feet above the level of the sea, and the temperature is too cold for the growth of corn. Avalanches are not of very unfrequent occurrence, and the accommodation which is provided in the midst of such perils is of the commonest and most temporary description. The water, which flows from ten or twelve sources, is clear and tasteless, emitting a slightly sulphurous odour. The road was made by some Tyrolese workmen in 1741. It is cut in the face of the solid rock, in a series of zigzags, and takes about five hours and a half to traverse it at a foot pace. Looking at the mountains from the side of Leuk, the path is imperceptible, and it is only on arriving close to it that the practicability of any ascent is perceived. The zigzags are too steep for carriages, but can be ascended by mules, and a wall of stones some four feet high on the side next the precipice guards travellers against danger. The best idea of the path and the surrounding scenery may be gathered from the following account given by a tourist:

"At nine o'clock one fine morning in September, I arrived at Konderstag, and commenced the ascent of the Gemmi Pass, which for some way was very steep, but at length I emerged from a narrow gorge into an open valley, about 6300 feet above the level of the sea, where there was already some snow which, of course, as the road ascended, increased in depth. Having passed some chalets (or mountain sheds), I perceived on the left the gloomy valley of Gastera, extending to the foot of Mount Altels, and further on passed over a place where the effects of an avalanche, in 1782, were still distinctly visible. I next threaded my way among the *debris* of a mountain which had probably fallen some centuries before, another species of the awful devastations to which these Alpine regions are liable. I now reached the Swarrenbach, a solitary habitation, used only during summer, where I had to pay a small toll of half a batzen, or about three-farthings, for the use of the road. I did not at the time, however, comprehend why this toll was demanded; for having no guide, and the snow, owing to a late fall, being now knee-deep, the road was quite invisible, and I made out my route entirely by the map. This dismal place is the scene chosen by Werner in his 'Le 24 Fevrier.' After leaving the wretched place, I came upon the lake of Daube, and as, when that was passed, I was evidently drawing near to the ridge of the Gemmi, I began to look out for the place to descend. This place, after some little difficulty, I found, and I then at once perceived why the toll had been demanded, the whole path being made by blasting, and the marks of it being everywhere visible; indeed, descent was out of the question anywhere else, for the southern side of the mountain was quite perpendicular, and I looked straight down from a height of nearly three thousand feet, on the village of Leuk; while along the valley in which it lay I tracked the course of the Dala, which rushed impetuously into the valley of the Rhone, on the further side of which the eternal snows of Monte Rosa terminated the view. The descent, once begun, was very rapid. I found a run down the declivity easier than a walk, and the mountain staff, or alpenstock, which I carried, rendered the turning at every zigzag safe and easy. I never saw such prodigious icicles as upon this occasion, they hung from every projection; many, close to which I passed, were much longer than my own height, and some that I saw at a distance must have been at least twenty feet long. On a projecting crag I observed a rugged pine, growing somewhat horizontally, and leaning over the precipice. It is said that a Valaisian once ascended this tree, and carried away its topmost bough. In this venturous attempt, he must have been suspended at a height of at least two thousand feet above the valley below. When I had nearly arrived at the bottom of the precipice, I observed at one side of a steep gorge in the side of the rock, a sort of sentry-box hollowed out of the rock, and apparently inaccessible. This, I was afterwards informed, was the station of a watchman, placed there to prevent smuggling between the two Cantons of Berne and Valais, and to watch sheep-stealers, who, by a thorough knowledge of the track, contrived to make their way up the mountain by a narrow rough gorge on one side of the regular road. The watchman cannot be seen by those who descend the gorge, till it is too late to retreat, and the offenders are thus detected. When I reached the foot of the pass and looked back, I could not perceive the least traces of the road by which I descended, and it seemed quite astonishing to me that I had ever got down at all."

For our last subject we return to the great Indian range, and select one of those mountain defiles in Affghanistan, which was with such difficulty and risk forced by the Anglo-Indian army on its march toward Cabul.

THE BOLAN PASS.

The road to the Bolan Pass leads through high sand-hills, which bound the course of a mountain torrent. Arrived at its mouth the road narrows itself, and entering into the mountains runs between lofty walls of rock which rise to a stupendous height on either side, and jut over toward the top so closely as often to exclude the rays of an almost vertical sun. The

THE BOLAN PASS.

overhanging portions seem to be constantly in danger of falling, as indeed they sometimes do, destroying all beneath. The road of loose sand is difficult from the nature of the soil, as well as from its being in all directions covered with flints and limestone of all sizes, from that of the pebble which the school-boy throws at a bird to that of huge rocks, like those the fabled Titans are said to have cast upwards in their wars against the deities of Olympus. The stream too crosses the path six or seven times in the course of the pass, and has to be forded at every turn. The difficulty of leading an army encumbered by artillery and stores through such a defile as this may be easily conceived, but it was heightened by the fact that there were other than inanimate obstacles to encounter. In the face of the rock, at a great height, rough caverns are excavated in which the fierce Beloochees ensconce themselves in order to watch the passage of an enemy through their territory, and constantly from these holes would protrude the long barrel of the mountaineer's cumbrous gun, and the flash and report would announce the fall of some unfortunate soldier in the pass below. Added to this, from dark ravines bodies of savages would pounce forth upon any unsuspecting straggler who lagged behind on the line of march, and a waggon with a wheel broken or embarrassed by difficult ground and separated a short distance from its convoy, was instantly surrounded, the drivers butchered, and the guards plundered. Though the advancing army did not suffer the disastrous defeat and massacre which befel flying troops in the Khyber, yet there was more than enough of blood shed to make the Bolan Pass prominent in the ghastly annals of those wars of aggression, which we hope, for the sake of humanity, may never again disgrace the rule of England in India.

AVALANCHES.

Avalanche has become a "Household word" with poets and writers, who use it as one of the most apt images of the sudden, the terrible, and the overwhelming. Of all the phenomena of mountain districts they are the most majestic and fearful. The icy expanse of the glaciers, the towering height of the mountains, the deep clefts of the passes and ravines, and the still lakes reflecting back the precipices from their clear deep waters, are all majestic; but it is passive majesty—grandeur at rest. The avalanche has motion, and brings with it swift coming danger, and sound louder than the roar of a battle-field, and that awakes up to completeness that sensation of the mind which impresses it most strongly with the true idea of sublimity.

These phenomena occur occasionally in the Pyrenees, and in Norway, but they are most frequent in the Alps, where the precipices are steeper. They may be divided into four kinds—the drift avalanche, the sliding avalanche, the rolling avalanche, and the ice, or glacier avalanche. Of these the drift avalanche is the least destructive. It is caused by a heavy fall of snow in calm weather, followed by a heavy wind, before the heaps have time to consolidate. The gale takes up the particles almost in the form of fine dust, and carries them off down the mountain, filling the whole atmosphere with them, enveloping travellers in a white sheet, and covering houses and buildings with a coating of snow. They seldom cause any damage, as from the absence of solidity they do not produce violent concussions, and their remains are easily removed.

As the drift avalanches are the least, so are the rolling avalanches the most perilous. When the snow has been frozen, and a quick thaw comes on, the surface becomes moist, clammy, and sticky. Here the avalanche has its small beginning in a few atoms, lying upon a steep declivity, adhering together. These, by the action of gravitation, fall downward, and gather in their descent other particles. Presently the lump becomes a ball, the ball a mass. It grows in weight from grains to pounds, from pounds to hundred weights, from hundred weights to tons—a mighty volume, every moment growing larger by adhesions of the surface over which it passes. And as it grows it gathers speed, at first moving slowly down some slope; then enlarged, rolling quickly down a more precipitous declivity; then bounding down a sheer descent, and leaping on a moving snow mountain till it reaches the valley below.

The sliding avalanche is also originated by a thaw, and takes place on slopes, less steep than those where the rolling avalanches commence. When the connection of the parts of a large sheet of snow is broken, the lower portions have a tendency to slide away, carrying all before them not of sufficient strength to resist their weight. They may be compared to what they look like at a distance, a flowing torrent, or river of snow; as if the ice-bound summits sent forth their congealed floods, as the burning peaks of Etna and Vesuvius emit their molten lava streams. When these snow-slips come in contact with any body too stedfast for them to sweep in their path, such as a large rock rooted firmly in the mountain, they divide like water, and flow on round its base. One of the most remarkable features of these sliding avalanches is the smallness of the cause which immediately tends to their production. When the masses of snow are loosened from one another, the impending avalanche seems to be suspended by a thread of tenacity so slight, that the smallest force is sufficient to set it loose. The foot of the hunter struck against the

THE AVALANCHE.

edge of a cleft in the snow, the concussion of the air caused by the discharge of a gun, or the vibrations of a vigorous halloo, are sufficient to set a large surface sliding off the mountain into the valley below. So well known is that fact, that at the dangerous periods of the year, the mule-drivers, who traverse the mountain paths, take the bells from the necks of the mules, for fear that the music might produce a catastrophe. In some valleys where avalanches are expected at certain seasons, guns are fired off to precipitate their descent, before they become sufficiently large or solid to do much damage.

A curious appearance is occasionally presented by one mass assuming in its fall the characters of the sliding, rolling, and drift avalanches we have described. First, upon a gentle slope, the snow begins to glide, then it reaches a steeper spot, and bounds and rolls, and, at last, striking a firm massive rock, breaks up into fragments, and is scattered away by the wind in a cloud of minute atoms. This must be one of the most magnificent sights among the many which the Alpine regions present. We can imagine ourselves looking at a high mountain in its snowy shroud, which, in its passive grandeur and colossal magnificence, dwarfs our littleness into insignificance. We feel that all it wants is motion to complete its sublimity. Suddenly that is added. As though the giant bulk was waking from the sleep of death, and casting off its grave-clothes, the sheet of snow begins to move. With a gentle pace it slides down; then, as though awakened to life, it burst onward, gathering velocity from its increasing weight, and then with a crash, to which the mountains echo, like a wave striking against a cliff, and dispersing from it, it strikes a craggy bulwark, and flies forward a snowy mist.

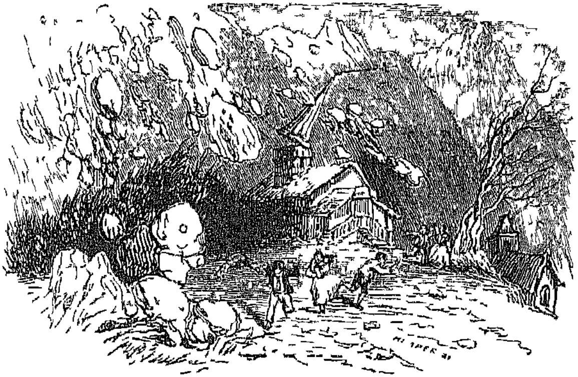
The fourth description of avalanche is that which proceeds from a fall of the ice of the Glaciers, which we have already described in an article upon that subject. It is not necessary to repeat the details here further than to say, that the causes are similar to those which produce the sliding of masses of snow. Sometimes clefts are produced by the weight of an immense sheet of ice, bearing unequally upon rugged ground—sometimes by the melting of the less solid portions of the surface. Sometimes the imprisoned air expanding forces its ways out in icy blasts, at others vast caverns melted away by the heat of the earth fall in at a great depth; and then a great bulk loosened from the rest glides downward, stopping the course of rivers, and desolating valleys. It was an avalanche of this kind which formed the lake mentioned under the head of Alpine floods, when M. Venetz, the engineer, tunnelled through the ice to drain off the imprisoned water. It was a similar avalanche which we have already recorded, as "The Fall of the Rossberg," whose surface, twice as large as the city of Paris, fell upon the village below; and a like catastrophe occurred at the lake of Lucerne, in 1801, when the wave raised by the plunge drowned eleven persons.

We take an example of the effects of a sliding avalanche from Simond, who explored most of the Alpine mountains. He says, "We sometimes saw a blue line suddenly drawn across a field of pure white; then another above it, and another, all parallel, and attended each time with a loud crash like cannon, producing together the effect of long protracted peals of thunder. At other times these portions of the vast field of snow, or rather snowy ice, gliding gently away, exposed to view a new surface of purer white than the first; and the cast-off drapery, gathering in long folds, either fell at once down the precipice, or disappeared behind some intervening ridge, which the sameness of colour rendered invisible; and were again seen soon after in another direction, shooting out of some narrow channel a cataract of white dust, which, observed through a telescope, was, however, found to be composed of broken fragments of ice or compact snow, many of them sufficient to overwhelm a village if there had been any in the valley where they fell. Our guides assured us that pushing with your foot against the edge of a beginning cleft in a bed of snow, is often sufficient to determine the fall of an avalanche. The discharge of a gun, the jingling of the bells of mules, the voices of men may be attended with the same consequences."

Another instance of a sliding avalanche is related by Mr. Dornford, who, in August 1820, in company with Mr. Henderson, Dr. Shomel, and M. Sellique, assisted by twelve guides, *attempted the ascent of Mont Blanc. The two latter* gentlemen abandoned the enterprise at the end of two days; the others proceeded, and after encountering great dangers, reached within three hundred yards of the summit, when a fall of snow took place, which carried the party perilously near to the edge of a stupendous precipice, killed three of the guides, and effectually prevented their further progress. Mr. Dornford gives the following account of the affair: "As we were crossing obliquely the long slope, which was to conduct us to Mont Maudit, the snow suddenly gave way beneath our feet, beginning at the head of our line, and carried us all down the slope to our left. I was instantly thrown off my feet, but was still on my knees, and endeavouring to regain my footing, when, in a few seconds, the snow on our right, which was, of course, above us, rushed into the gap thus suddenly made and completed the catastrophe, by burying us all at once in its mass, and hurrying us downward past the crevice, about a furlong below us, and nearly parallel to the line of our march. The accumulation of snow instantly threw me backwards, and I was carried down in spite of all my struggles. In less than a minute I emerged partly from my own exertions, and partly because the velocity of the following mass had subsided from its own friction. I was obliged to resign my pole in the struggle, feeling it forced out of my hand; a short time afterwards I found it on the very brink of the crevice. At the moment of my emerging, I was so far from being alive to the danger of our situation, that on seeing my companions at some distance below me, up to the waist in snow, and sitting motionless and silent, a jest was rising to my lips, till a second glance showed me that, with the exception of Mathieu Balmat (a guide), they were the only remnants of the party visible. Two more, however, being those in the interval between myself and the rear of the party, having quickly re-appeared, I was still inclined to treat the affair as a ludicrous though perplexing delay, in having sent us down so many hundred feet lower, than in the light of a serious accident; when Mathieu Balmat cried out that some of our party were lost, and pointed to a crevice which had hitherto escaped our notice, into which he said they had fallen! a nearer view convinced us all of the sad truth.

"The three front guides being where the slope was somewhat steeper had been carried down with greater rapidity, and to a greater distance, as a fall had been carried into the crevice, with an immense mass of snow upon them, which rose nearly to the brink; Balmat, who was fourth in the line, being a man of great muscular strength, as well as presence of mind, had suddenly thrust his pole into the firm snow beneath, when he felt himself going, which certainly checked in some measure the force of the fall. Our two hindermost guides were also missing; but we were soon gladdened by seeing them make their appearance, and cheered them with loud and repeated hurrahs. One of these had been carried into the crevice, where it was very narrow, and had been thrown, with some violence, into the opposite brink. He contrived to scramble out without assistance, at the expense of a trifling cut on his chin. The other had been dragged out by his companions quite senseless, and nearly black from the weight of snow which had fallen on him. In a short time, however, he recovered. It was long before we could convince ourselves that the others were past hope, and we exhausted ourselves fruitlessly for some time in fathoming the loose snow with our poles. When the sad truth burst upon us, our feelings may, perhaps, be conceived, but cannot be expressed." The escape of Mr. Dornford, and the remainder of the party, seems but little short of miraculous; and we can hardly estimate the courage, born of custom, which leads men, like the chamois hunters and guides, habitually to expose themselves to such dangers, or the strength of the curiosity which tempts travellers within their range. It is easier both to understand and admire the motives which inspire the inhabitants of the Swiss mountain monasteries to brave the perils of the place, and the love of country, which ties the Switzer to his native valley, and induces him again to rear up his roof tree on the spot, which a torrent or an avalanche has desolated.

Of the rolling avalanche, one of the most destructive on record, fell on the village of Rucras, in the valley of the Tawich, in the Canton of the Grisons, in the year 1749. Gathering on the highest peaks in a small ball, it came slowly down, accumulating as it rolled, till it reached the devoted village. This happened in the night; and the most extraordinary fact connected with it is, that it fell so lightly and silently as not to alarm the inhabitants, although large enough to cover the whole village. The people awoke at their usual hour, and blank darkness met their eyes. They thought that they must have been roused before their time, and waited and watched for the coming day. No dawn, however, broke upon them, and unable any longer to bear the suspense of the unwonted delay, they rose and endeavoured to ascertain the cause. It was then discovered that the whole village was buried beneath the snow, which was so lightly thrown down, that the air in the interstices was sufficient to support respiration. The work of extrication was immediately commenced, and a hundred persons were dug out. Sixty of these were alive; but forty who lived in spots where the avalanche had fallen with the greatest weight had breathed their last. What seems still more incredible, considering the silence with which it was all effected is, that the avalanche had either produced, or been accompanied by a land-slip, which had removed the ground on which the village stood bodily some distance from its former position. A more recent instance of devastation occurred in the Valais, in 1829, when the whole village of Biel, in the valley of Conches, containing 459 inhabitants, was overwhelmed, and many lives lost. The peasants endeavour to secure their cottages against these visitations, sometimes by the erection of strong stone walls on the side of the villages next the mountain, at others by a triangular building, as high as the roof, the acute angle being intended to break the blow. In the valley of St Anthony, in the Prettigau, the protecting pyramids are constructed of hard snow. Those precautions are effectual in the case of small falls; but in such instances as those we have mentioned, where the descending body weighs many thousand tons, they are not only ineffectual, but being thrown down on the erections they are intended to secure, they add to the completeness of the ruin The year 1820 was marked by three of these catastrophes, one of which fell in Fettan, in the high valley of the Engaddin, in the Grisons, and killed sixty-four persons; another at Abergestolen, in the Canton of Wallis, destroying eighty-four persons, and four hundred head of cattle; and the third at Brieg, in the same canton, when twenty-three persons perished. We have described an avalanche which removed a village from its site, a similar occurrence took place in the case of a forest in 1806. In that year an avalanche descended into Val Calanca, in the Grisons, which dislodged a forest from one side of a valley, and carried it to the other, leaving a fir-tree upon the roof of a parsonage house.



LAND-SLIP

Though in our own persons in this country, we are free from calamities of this nature yet there is evidence to be found in the hilly regions of England, that there were once glaciers and snow-slips here. Happily for us they exist no longer, and we are not called upon to display that love of the father-land so strong in the natives of most parts of the earth, which leads them to cling with devotion to the most desolate spots, and to brave every form of inconvenience and danger, and which makes them, when transported to more favoured lands, look back with tearful regret, or joyous anticipations of return, to that spot which they designate by the magic syllable of HOME.

THE MAELSTROM AND OTHER WHIRLPOOLS

AMONG the many dangers to which the early mariners were subject one of the greatest was of shipwreck from whirlpools. In the old Scandinavian literature we find frequent mention of them, generally associated with some imaginary demon, or the anger of a fancied deity, whom the ancient Sea Kings had neglected to propitiate before they mounted their "Sea *Steeds*." *These phenomena have in them the true elements* of the sublime-majestic power, and the capability of producing terror, and we may easily imagine how the men of the olden time, who did not trace the action of physical causes, would naturally attribute their effects to supernatural agency. The Scandinavian warrior who lived but for the fight, to whom the sea was a natural element, and whose strong strung nerves never quivered in the presence of human danger to be averted by manly effort, was keenly alive to the terrors of the imaginary. When the roar of a whirlpool broke upon his ear, the cheek bronzed by the sea breeze paled, and when his bark was engulphed, and carried round by the torrent which no strength could stem, he gave himself up as though paralysed to the fate for which he believed the gods had destined him.

The most famous of all whirlpools, as well as the most terrible, is that of the Maelstrom, which is situated on the coast of Norway, between the islands of Mosker or Moskoe and Warne. At this place there is a deep channel where the tides run with great violence from north to south for six hours; and at the periods when they are more than ordinarily strong, or when their course is impeded by high winds, an agitation of the water is produced by which a whirlpool is created. At the periods of high and low water, and when light winds are blowing, ships are enabled to pass through the strait without much danger, but when a gale comes on they keep far out to sea, at a distance from the dreaded spot. The fishermen who ply their vocation in these waters and who have occasion to pass from one island to the other, sometimes cross it in their light boats waiting for the calmest moment and selecting the most favourable spot to do so, but they are well skilled in the signs of the weather and the tides, and never venture when there is the appearance of danger.

When the Maelstrom is lashed up to its greatest fury, the aspect it presents and the sounds it causes are truly terrific. Its roar, which is said to be louder than that of the cataract of Niagara, is heard through all the noise of the tempest at the distance of leagues, and the rocky shores by which it is bounded seem to thrill and tremble with the violence of its reverberations. Far from it, and long before the threatening crests of its waves are seen, a strong current rushing toward it draws objects, apparently a long distance beyond its influence, toward the centre of the vortex, and once in the stream destruction is inevitable. Nothing that courage can prompt or skill can execute will avail to avert the threatened danger; onward, spite of helm or sail, goes the luckless ship, once within the scope of its force, to certain destruction. Borne swiftly on, the waters buoy it up till where the whirling waves thunder the loudest—the vortex is reached, and then, amid the foam whirling round in spiral lines with fearful rapidity, it rushes madly round in circles, growing each moment narrower, and is at last sucked down to where the jagged rocks of the rugged bottom lie nearly two hundred and fifty feet below the boiling surface. The remains of whatever shares this fate are cast up by the next tide, rent and torn into fragments, the larger portions of timber being jagged and notched as though some gigantic saw had been at work upon them.

It not unfrequently happens that animals perish in the Maelstrom. Bears sometimes attempting to swim from one island to the other are caught by the eddy, and carried away in spite of all their struggles. When fairly immersed in the circle they appear to lose all power of resistance, and submit to their fate with loud roars of terror, which are plainly heard upon the neighbouring coasts. It is even said that the leviathan of the deep, the gigantic whale, is occasionally caught while swimming through its native waters, and that this denizen of the sea shares the inability of all living creatures to contend against the insatiate foe. In vain it plies its fins and lashes its tail, and casts its vast form out of the water in mad bounds for life. The invisible power which rules the waves surely hurries it on to the centre

THE MAELSTROM.

draws it down, dashes it against the rocks, and a few hours afterwards casts it dead and maimed upon the shore.

Some authors assert that in reality there is not any circular motion in the waters of the Maelstrom, the only action being that of great undulations and heavings of its waves. This, however, it would seem, from the best testimony, is an error. The simple undulations are confined to the strong tideway leading to the whirlpool, and there where a central eddy is, made probably by the peculiar conformation of the inequalities of the bottom, a centrifugal force is produced which causes a circular motion. Though that is the case with the Maelstrom, it does not appear to be the fact in the instance of Charybdis, near Messina, which though considered by the ancients a true whirlpool, and now generally spoken of under that designation, is ascertained not to have any vertiginous motion, by which a vessel might be absorbed, although its action is partially and intermittently circular. There is a strong tidal current near the Faro, or lighthouse, which runs from north to south, and *vice versa*, six hours alternately. When the wind sets in so as to blow obliquely on this current, an agitation of the water is caused similar to that in a storm at sea. The undulations, however, do not pervade the whole space, but are confined to several circles, varying from one hundred feet in diameter, the space between them being comparatively calm. We are not aware that any satisfactory explanation has as yet been given of this phenomenon. Spallanzani, who has given the best description of it, was rowed over the spot in a small boat when the wind was light without experiencing any danger; but he was told that in tempestuous weather the waves rise to such a height as to overwhelm and sink small vessels, and to render large ones unmanageable, so that they are driven on to the rock of Scylla and wrecked. Few catastrophes of that sort occur now, but when the art of navigation was less perfect than it has become in our day, the ancient mariners told many a tale of death, and Scylla and Charybdis introduced into the works of poets have been handed down to posterity as the emblems of hidden dangers. The risk, after escaping Scylla, of falling into Charybdis, is a metaphor commonly used even by modern writers. Of course a great number of legends and superstitious tales are associated with Scylla and Charybdis, one of which is that a female monster, surrounded by great numbers of ferocious dogs and wolves, lies watching upon the shore, and devours the mariners who may escape from the sea with life. Like most fables this fancy has a foundation in fact. Not, indeed, that there ever was a Siren of that kind, but about Cape Peloro there are some hollow rocks, which resound to the beating and the roar of the waves, and produce a sound very much like the barking and howling of numerous hounds. On this resemblance imagination acted, till the noise was impersonated in the canine form, and a fabled demon huntress created to control the pack.

Among the stormy and rocky seas of the Orkney Islands there are several true whirlpools capable of sinking small boats; but the fishermen have a simple and easy way of obviating the danger arising from them. When a boat approaches such a spot, its crew, aware that the revolving motion of the water may be checked for the time, by the circular lines in which it moves being broken, throw in a log of wood or a bundle of straw, either of which is sufficient to disturb the circle, and before it is reformed the boat passes quickly and safely over.

Those who are acquainted with the navigation of rivers have frequently observed small whirlpools at points where a river takes a sudden bend, or where the bed is suddenly narrowed. In either of these cases the lines in which the water runs are disturbed and forced off from their former direction obliquely toward the centre of the stream When this happens they meet other particles of water, and obstruct their passage, and from the opposition of forces centrifugal power and curvilinear action are set up. These are true whirlpools like the Maelstrom, the surface of each representing a shallow inverted cone, higher at the edges, and gradually sloping down to a point in the centre. Whirlpools of this kind are formed at the shoulders of the arches of bridges, where the current is deflected from its natural course, and to their action the rapid wearing away of the supports is often to be attributed. The bed of the river is at such places less pressed upon in consequence of the water having a new and upward motion, and the water under the bed exerting a hydrostatic action, rises sometimes with such force as to blow up peers and dams. Most of the accidents which occur in hydraulic operations arise from such causes. Inequalities in depth also contribute to the production of whirlpools by deflecting the water from its line of motion, much in the same way as where the banks wind or contract the course of the river. But in these cases the whirlpools so called are vertical, the water either rushing down the descent and leaving a hollow above, or rushing up the slope and forcing its way, in its new direction, above the surface in the form of a wave.

We may often, from small phenomena, learn the causes of larger ones; and these whirlpools of the rivers point out clearly how Scylla and the Maelstrom arise. The Maelstrom is a whirlpool combining both circular and vertical motion. The strong tide bursting through the narrow strait between the two islands is deflected from both, and the opposing currents thus induced under the action of centrifugal force, form a vortex, while the rugged and unequal bottom, full of hollows and elevations, cause depressions and waves at the surface. Charybdis, where the tide is not so much confined, and is only partially deflected from one side by the wind, results from the irregularity of its bottom; the influence which causes circular motion only acting with sufficient power to enclose the undulations within a ring-like form, which do not present any appearance of revolving within themselves.

THE ERICSON CALORIC ENGINE.

THE great mass of men always find it difficult to estimate at the moment the importance of any great mechanical discovery. There is a natural conservatism in the majority of minds, which leads them to cling to old modes of action as well as old institutions, the force of which it is difficult to overcome. New things, by those who do not take the trouble to inquire into them, and often by those who do, are taken to be unproven till they begin to be adopted. In a great many cases that which has not been done looks like that which cannot be done—the unperformed taking the aspect of the impossible. We trace the action of this habit of mind upon the course of those who first projected great scientific or mechanical improvements. It is not necessary to do more than to allude to the incredulous derision the man met with who first struck out the idea of producing light from the gas which now turns the night of our cities into day, or to the trials Fulton experienced at the hands of sceptics when he proposed to move a vessel by steam, the agent which is now our great locomotive power. Yet there is a compensation in that spirit of wonder or curiosity which generally mingles so largely with incredulity, and induces those who do not believe to go and see; the result is, that some of those who go to scoff return to think, and so in time little by little, great truths are established.

There is, perhaps, less of this unbelief in possibilities in our time than there has been in any preceding period. Living as we do in an age of wonders, with agencies, some of which a few generations ago were scoffed at, and some not dreamt of, the capacity of the general mind is enlarged; and the habit of pre-judging dying away. One great phenomenon prepares us for the more easy reception of another, and confidence in the power of man's invention has so grown that even wild and impracticable schemes receive more attention than would formerly have been bestowed upon correct and well matured theories. It is no wonder then that the intelligence from America, that Mr. Ericson, an engineer of Danish birth or extraction, had discovered a new motive power, excited some curiosity here—a feeling which was heightened when the news was received that one of his caloric engines was in actual operation, and that a large ship was building to test the applicability of the invention to navigation upon a large scale.

It is, however, known to comparatively few, and we mention it partly from that fact, and partly because it illustrates the difficulties which have beset and hindered the ingenious minds of the world, that this invention which is now causing so much wonder, was first brought to light and put into practical operation in London. Like many of the inventive efforts for which the United States get credit it belongs in conception to the old world, but in consequence of want of appreciation has taken refuge in the new. Twenty years, or thereabouts, ago Mr. Ericson built a machine and set it to work in London. A pamphlet which he printed and circulated here privately in 1833, is still extant, and contains more precise information as to the machine than the American journals have made public, or indeed, than the inventor would seem to be now willing to afford. But Mr. Ericson could not find either support or encouragement here and he left the country—his discovery remaining comparatively unknown till a very recent period.

The caloric engine is distinguished from all others intended to produce motion, by the fact that the motive power employed is heated air, and by a peculiar arrangement which we shall endeavour to describe by which the heat lost in the condenser of the marine engine, or suffered to go to waste in the atmosphere, in the case of the locomotive, is caught as it were, after having made one effort and made to exert itself again. This obviates the necessity for large furnaces and causes great economy in fuel, and as air is much more readily expanded by heat than water a large saving is effected in that manner. Another characteristic of the Ericson and one which at first sight might seem objectionable is, that it acts by the counteraction of opposing forces; the piston in the two cylinders instead of aiding each other, as in the ordinary engine, counteract each other. The reason for this, however, will be seen when the construction and principles of the engine are described.

It is at all times difficult to make mechanical inventions perfectly understood by the use of words. For a thorough comprehension drawings which, in this case, are unattainable, are generally necessary. But, presuming as we do, that most readers have some knowledge of the parts of the steam-engine and relying on the simplicity of the new machine the task will probably be easier than usual. The mechanical part of the caloric engine consists of two cylinders, one at either end of an oscillating beam, as in the ordinary steam-engine; these cylinders have pistons and slide-valves. If the beam be tilted, one of the pistons rises, and the other descends in its cylinder, each having the same length of stroke. One of these cylinders is much larger than the other; the reason of which will be seen presently. The large cylinder, called the hot cylinder, is close to the fire; the smaller one, called the cold, at some distance from it. It is intended to press down each of the pistons alternately, by means of expansive air, in a highly compressed state, acting upon their tops. Hence the difference in size. If they were both equal, the power of one would exactly counterbalance that of the other; but by the inequality, two forces are produced acting in opposition, the one capable only of checking, but not preventing the action of the other. If then both cylinders be pressed upon, the piston in the larger cylinder descends and forces up that in the smaller one, causing an oscillation of the beam. That done, by means of the slide-valves, the pressure is transferred to the opposite ends of the pistons, and a contrary effect is produced. So far the arrangement seems simple enough, and rather inferior than superior to that of the ordinary steam-engine, where both the pistons act in concert; but the most ingenious and curious part of the machine has yet to be described.

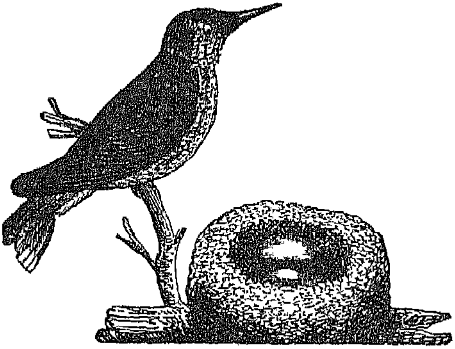
Attached to the bottoms of the cylinders, and connected with them by tubes, is a vessel which Mr. Ericson has named the regenerator. The construction of this he now appears to make a secret, for Mr. Beecher Stowe, writing an account, a short time ago, for an American journal, which was extensively copied into the English newspapers, professes to be unable to obtain any information as to its peculiarities. The pamphlet, however, printed by Mr. Ericson, in 1833, is more communicative upon this point. The regenerator is a long vessel through which the connecting pipe, from the hot cylinder, passes in a very circuitous manner, and then proceeds, being led through cold water, to the bottom of the cold cylinder; from the top of which, similar pipes pass through the regenerator, and over a small furnace, to the top of the hot cylinder.

Now for the mode in which this acts. A small force-pump is attached to the machine, by means of which, air is, in the first instance, forced in and compressed, till it attains a certain degree of elasticity. This air is heated by the furnace near the hot cylinder till it expands, and then comes pressure upon the pistons. The larger one descends, the smaller greater, we work with the other agents, and increase our force, by substituting caloric for steam, as we have done gas for oil, and electricity for carrier-pigeons, man shall go on "conquering and to conquer." Making the elements his slaves, and calling up from the mines of mineral and metal, dark gnomes to do his bidding, he shall accomplish the high destiny reserved for intelligence, and out of the original curse of toil, earn for himself the choicest of blessings.

WONDERFUL BIRDS' NESTS.

Of all the moving creatures that give animation to this world of life, birds are the dearest and most meet for love. Nature paints her pictures with the colours of flowers, but she breathes her poetry in the songs of birds. The one is the mute poetry appealing to the eye, the other the full-souled expression appealing to the ear. All over the world the flowers wave in ringlets of gold, and wreathes of snow and azure, and bands of purple and ruddy radiance, as if Hyacinth had spilt his blood anew, and in flakes of amber and scarlet, as if the setting sun had left his glory all behind. So Nature prepares an altar of flowers bound with grassy fillets and sprinkled with the holy water of the morning dew; but she must have priestesses to chaunt her matin and vesper songs, full-throated choristers to breathe the anthem in delicious flute-music, and multitudes of devotees, to bear the sonorous burden of the chorus. So then flowers and birds make up the religious service of this green temple, a temple to which the forest serves as pillars, the blue hills as bounding walls, and the blue sky with its noon radiance, its blood-red evening glory, or its pale holy starlight, for an arching roof. It is not their spiritual history and uses, however, that concern us here, so leaving the suggestions of the entire creation, let us learn a lesson of the wisdom of the Father as seen in one of its manifestations—that of birds' nests. We call up no reminiscences of boyhood, when buttercups were our California, and birds' nests, jewels without price; but by a sober pursuit of facts, gain a few hints of that wonderful instinct which prompts the bird to build its home, and gives it skill to accomplish a wonderful fabric.

Birds' nests might be classified under general heads; but as it is our duty to notice only the more wonderful, we pass many kinds which are otherwise worthy of attention, and treat of a few which stand out as remarkable. The first we shall instance is,



THE HUMMING-BIRD'S NEST,

Because it is unique as a type of all other nests, and as a specimen of the wonderful in its perfection and minuteness. The humming-bird is itself a remarkable creation, fit rather for the old world of fairy lore and wild enchantment, than for this daylight one of railroads and "cotton cities." It is the smallest of birds, and the most gorgeous of any in the display of colours in its feathers. Horace Smith beautifully addresses it—

Minutest of the feathered kind,
Possessing every charm combined,
Nature, in forming thee, designed
That thou shouldst be
A proof within how little space,
She can comprise such *perfect grace*,
Rendering thy lovely, fairy race,
Beauty's epitome.

Those burnished colours to bestow,
Her pencil in the heavenly bow
She dipp'd; and made thy plumes to glow
With every hue
That in the dancing sunbeam plays;
And with the ruby's vivid blaze,
Mingled the emerald's lucid rays
With halcyon blue.

"About the 25th of April," says Wilson, "the humming bird usually arrives in Pennsylvania, and about the 10th of May begins to build its nest. This is generally fixed on the upper side of a horizontal branch, not among the twigs, but on the body of the branch itself. Yet I have known instances where it was attached by the side to an old moss-grown trunk, and others where it was fastened on a strong rank stalk or weed in the garden; but these cases are rare. In the woods it very often chooses a white oak sapling to build on, and in the orchard, or garden, selects a pear-tree for that purpose. The branch is seldom more than ten feet from the ground. The nest is about an inch in diameter, and as much in depth. The outward coat is formed of small pieces of a species of bluish-grey lichen that vegetates on old trees and fences, thickly glued on with the saliva of the bird, giving firmness and consistency to the whole, as well as keeping out moisture. Within this, are thick matted layers of fine wings of certain flying seeds closely laid together; and lastly, the downy substance from the great mullein, and from the stalks of the common fern, lines the whole. The base of the nest is continued round the stem of the branch to which it adheres, and when viewed from below, appears a mere mossy knot or accidental protuberance. The eggs are two, pure white, and of equal thickness at both ends. On a person's approaching their nest, the little proprietors dart around with a humming sound, passing frequently within a few inches of his head, and should the young be newly hatched, the female will resume her place upon the nest, even while you stand within a yard or two of the spot."

Turning from this minute nest to one of larger dimensions, we find another wonderful instance of beauty of construction, combined with simplicity, in the

REED BUNTING'S NEST,

Which is a most elegant basket, woven of broken rushes, and usually suspended among the river sedges, like a small Moses' ark, concealed from the world in a region of bullrushes. One of these nests, in the "Zoological Gallery" of the British Museum, exhibits extraordinary beauty of construction and has a most artistic appearance, even in its present decayed and mutilated condition. It is carefully suspended on three stems of reeds, round which the edges of the nest are woven, so that the supporting reed pillars pass through the sides of the nest from the bottom to the top. Syme says of this bird's architecture, "the nest is placed amongst rushes or ingeniously fastened to three or four reeds; and in this floating cradle, though rocked by the tempest, the hen securely sits, without fear or dread." Graves says, he has himself seen the hen sitting on the nest when, at every blast of wind, the reeds to which it was suspended were bent down to the water—

> Reasoning at every step he treads,
> Man yet mistakes his way,
> While meaner things, whom instinct leads,
> Are rarely known to stray.

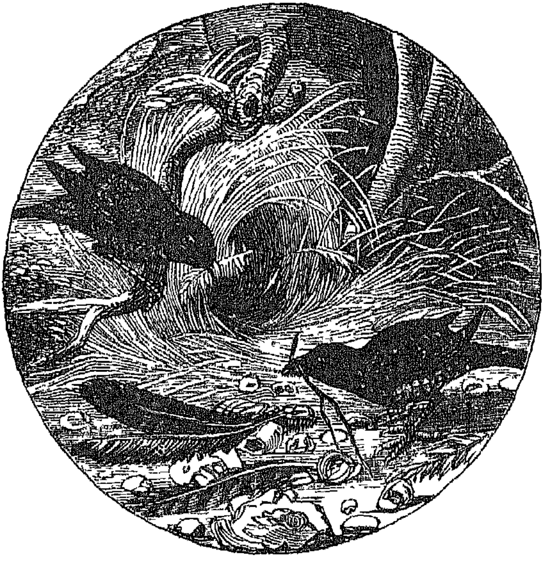
THE BOWER BIRDS

hibit a most remarkable trait of mechanical invention, and though no longer puzzling naturalists by the presentation of those bowers whose origin was inexplicable, they are still regarded as among the most wonderful instances of instinctive endowment presented to us by any department of nature. These birds, in addition to skill in preparing their nests, *build for themselves also these bowers or retreats within* which they conceal *themselves or retreat for shelter* from the mid-day heat. Of a pair of satin bower birds recently imported into this country, we quote the following notice from the "Illustrated Journal.'

" The Satin Bower Bird was one of the earliest known species in the Australian fauna, and probably received the name of Satin Grakle, by which it was described in Latham's " General History of Birds," from the intensely black glossy plumage of the adult male, which the young bird at the Gardens is now beginning to assume, as indicated in the upper figure of our illustration. But although the existence of the bird was noticed by most of the writers on the natural history of Australia subsequent to Latham, it appears that no suspicion of its singular economy had extended beyond the remotest settlers, until Mr. Gould, whose great work on the "Birds of Australia" is known to every one, unravelled the history of the *Bowers*, which had been discovered in many parts of the bush, and which had been attributed to almost every possible origin but the right one.

" The constructive instinct of the Satin Bower Bird (*Ptilonorhynchus holosericeus*) is rivalled, according to the statement of Mr. Gould, by two species of a closely allied form, known to ornithologists as *Chlamydera maculata* and *Chlamydera nuchalis*. The former of these constructs a bower nearly three feet in length; and there is no question but that it would thrive as well in confinement as the Satin Bird, if the Society could obtain specimens.

" The Bower, as will be seen by the illustration, is composed of twigs woven together in the most compact manner, and ornamented with shells and feathers, the disposition of which the birds are continually altering. It is probable that, in a state of nature, these decorative materials are conveyed from considerable distances to the site of the bower, which is uniformly beneath the shadow of a tree. The extreme shyness of the birds, who retire from the bower on the first approach of a spectator, accounts for the origin and object of these structures remaining so long unknown, even to the settlers. They have no connection with the nest, and are simply prying-places, in which the birds divert themselves during the months which immediately precede nidification.



SATIN BOWER BIRDS.

"The birds in the Regent's Park occupy themselves at intervals throughout the day in altering or making additions to the bower, chasing each other through it, saluting each other with grotesque movements, and uttering varied notes of love, anger, and reconciliation. The illustration has been engraved by permission of the Council of the Zoological Society, from a drawing in their possession made at the Gardens by Mr. Wolf, whose talent is inferior to none in delineating the characteristic action of birds. The engraving is necessarily of small size, to suit the space here devoted to it; but the birds themselves are nearly as large as a jackdaw. The female is green in colour, the centre of the breast feathers yellowish; the unmoulted plumage of the male is similar: the eyes of both are brilliant blue."

Surrounded by the scenery of the bush, and presenting such a fairy-like appearance in the Australian wilderness, one of these bowers recalls Milton's description—

> A sylvan lodge, that like Pomona's arbour smil'd,
> With flow'rets decked, and fragrant smells. The roof
> Of thickest covert was inwoven shade,
> Laurel and myrtle; and what higher grew
> Of firm and fragrant leaf: on either side,
> Acanthus, and each odorous bushy shrub,
> Fenc'd up the verdant wall: each beauteous flower,
> Iris, all hues, roses and jasmine,
> Rear'd high their flourish'd heads between, and wrought
> Mosaic: under foot the violet,
> Crocus, and hyacinth, with rich inlay
> Broider'd the ground; more adorned than with stone
> Of costliest emblem. In shady bower
> More sacred, or sequestered though but feigned,
> Pan or Sylvanus never slept, nor nymph,
> Nor Faunus haunted.

Some of the instances of gregarious birds which unite in communities and build nest villages, are of great interest. Like the beaver, the ant, and the bee, these birds congregate in a common home, which is built and maintained by the united efforts of many individuals. The

LOCUST-EATING THRUSH

Is a species which in Southern Africa follows this sort of communistic life. These unite in forming a common fabric for containing individual nests, large enough for a vulture. One of these, which Barrow met with on a clump of low bushes at Sneuwberg, consisted of a number of cells, each of which formed a separate nest, with a tubular gallery, leading into it through the side. Of such cells each clump contained from six to twenty. One roof of twigs woven into a sort of basket-work covering the whole. They also build, along the banks of the Orange river, on the tall mimosa-trees, which were observed to be loaded with thousands of their nests. Dr. Latham supposed this to be the same bird which is mentioned by Thunberg as digging a hole for its nest in the bank of a river; or in the hole of a ruined building, or a decayed tree. But such differences in habit little agree with the distinguishing characteristics of a similar species.

THE PENSILE GROSBEAK,

Whose nest is described by Mr. Barrow, is another bird which adopts the same plan, and constructs a nest of sufficient size to accommodate numerous families, and with one small orifice by which it is entered. This grosbeak is a species of loxia, or grosbeak, well known in South Africa, from the circumstance of its nest being invariably suspended over water. The nest is shaped like a chemist's retort, and is suspended from the head; so that the shank, of eight or nine inches long, at the bottom of which is the aperture, almost touches the water. This curious little habitation is made of green grass, firmly woven together, and with much elegance of outline. Pringle says, that sometimes twenty or more are suspended from a single tree.

But there is another species of loxia which lives in a state of society a little more republican; it is called the

SOCIABLE GROSBEAK,

from the fact of many of its nests being united in one clump, under a common roof: each nest frequently containing several hundreds of individuals.

"The industry of these birds," says Mr. Paterson,* "seems almost equal to that of the bee. Throughout the day they appear busily employed in carrying a species of fine grass, which is the principal material they employ for the purpose of erecting this extraordinary work, as well as for additions and repairs. Though my short stay in the country was not sufficient to satisfy me,, by ocular proof, that they added to their nests as they continually increased in their numbers; still from the many trees which I have seen borne down by the weight, and others that I have seen with their boughs completely covered over, it would appear that this is really the case. When the tree that is the support of this aërial city, is obliged to give way to the increase of weight, it is obvious that they are no longer protected, and are under the necessity of building in other trees. One of these deserted nests I had the curiosity to break down, to inform myself of the internal structure of it; and found it equally ingenious with that of the external. There are many entrances, each of which forms a regular street, with nests on both sides, at about two inches distance from each other. The grass with which they build is called the Boshman's grass, and I believe the seed of it to be their principal food, though, on examining their nests, I found the wings and legs of different insects. From every appearance, the nest which I dissected had been inhabited for many years, and some parts of it were much more complete than others. This, therefore, I conceive to amount nearly to a proof that the animals added to it at different times, as they found necessary, from the increase of the family, or rather of the nation or community."

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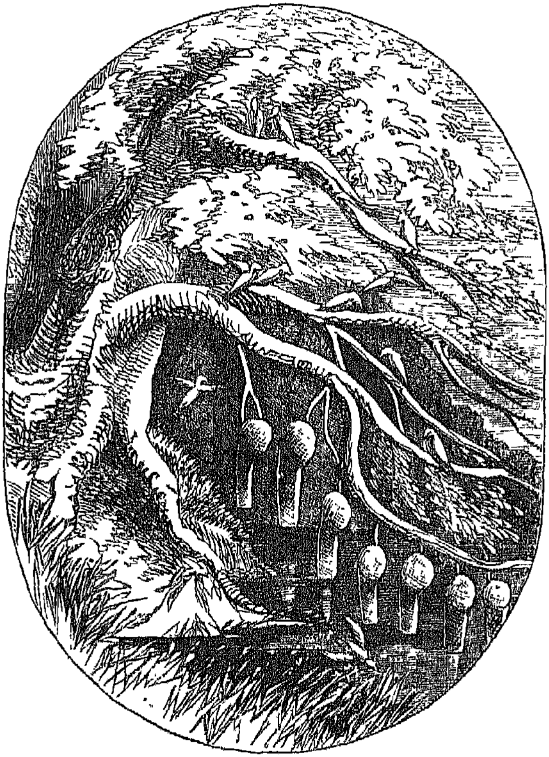
* Quoted in "Wood's Zoography," vol. i. p. 357.

It will be seen, from the following description of the same structures, that the streets of nests are a mere fancy, though enough of the marvellous remains to gratify the curious. "I observed," says Vaillant, "on the way, a tree with an enormous nest of those birds to which I have given the appellation of republicans; and, as soon as I arrived at my camp, I despatched a few men, with a waggon, to bring it to me, that I might open the hive, and examine its structure in its minutest parts. When it arrived, I cut it to pieces with a hatchet, and saw that the chief portion of the structure consisted of a mass of Boshman's grass, without any mixture, but so compact and firmly basketed together as to be impenetrable to the rain. This is the commencement of the structure; and each bird builds its particular nest under this canopy. But the nests are formed only beneath the eaves of the canopy, the upper surface remaining void, without, however, being useless; for, as it has a projecting rim, and is a little inclined, it serves to let the rain-water run off, and preserves each little dwelling from the rain. Figure to yourself a huge irregular sloping roof, and all the eaves of which are completely covered with nests, crowded one against another, and you will have a tolerably accurate idea of these singular edifices.

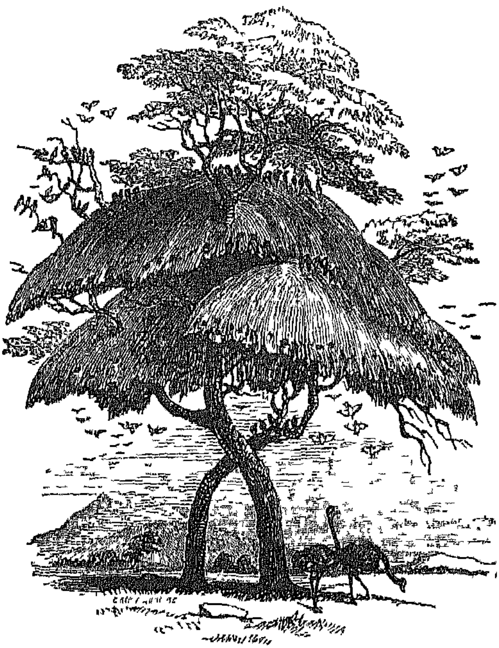
"Each individual nest is three or four inches in diameter, which is sufficient for the bird. But as they are all in contact with one another, around the eaves, they appear to the eye to form but one building, and are distinguishable from each other only by a little external aperture, which serves as an entrance to the nest; and even this is sometimes common to three different nests, one of which is situated at the bottom, and the other two at the sides. According to Paterson, the number of cells increasing in proportion to the increase of inhabitants, the old ones become "streets of communication, formed by line and level." No doubt, as the republic increases, the cells must be multiplied also. But it is easy to imagine that, as the augmentation can take place only at the surface, the new buildings will necessarily cover the old ones, which must therefore be abandoned.



PENSILE GROSBEAKS' NESTS.

"Should these even, contrary to all probability, be able to subsist, it may be presumed that the depths of their situation, by preventing any circulation and renewal of the air, would render them so extremely hot as to be uninhabitable. But while they thus become useless, they would remain what they were before, real nests, and change neither into streets nor sleeping-rooms.

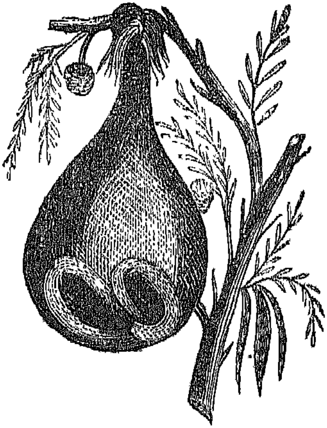
"The large nest that I examined was one of the most considerable I had anywhere seen in the course of my journey, and contained three hundred and twenty inhabited cells, which, supposing a male and female to each, would form a society of six hundred and forty individuals. Such a calculation, however, would not be exact. I have spoken of birds among which one male is in common to several females, because the females are much more numerous than



SOCIABLE GROSBEAKS' NESTS.

the males, the same is the case with many other species, both in the environs of the Cape and in the colony; but it is particularly so among the republicans. Whenever I have fired at a flock of these birds, I have always shot four times as many females as males."

There is also a third species of grosbeak, called the baya, which constructs a very remarkable bottle-shaped nest.



THE BAYA'S NEST

Is remarkable for its pendant lightness and great symmetry of outline. The bird itself is a species of sparrow of brilliant plumage and uncommon sagacity. All through Hindostan it is very prevalent, where it associates in vast numbers, and cheers the grove and the village with a cheerful twitter at sunrise and sunset. Their nests are sprinkled over clumps of palmyras, acacias, and date-trees, on the boughs of which the birds assemble towards evening and maintain a social converse in their own cheery language. The nests are formed of long grass woven into the shape of a bottle, suspended by the neck to the extremity of a flexile branch, the more effectually to secure the eggs and young brood from serpents, monkeys, squirrels, and birds of prey. Their nests contain several apartments, appropriated to different purposes; in one, the hen performs the office of incubation; another, consisting of a little thatched roof, and covering a perch, without a bottom is occupied by the male, who, with his chirping note, cheers the female during her maternal duties.

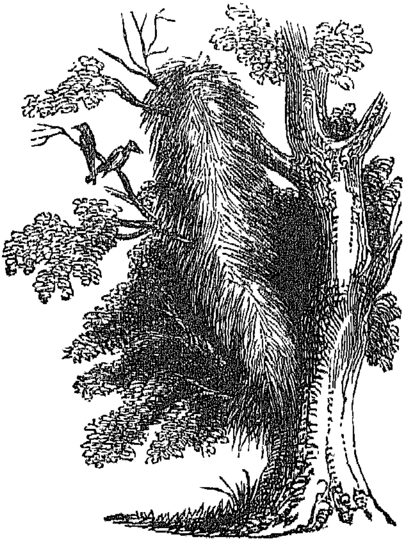
Dr. Fryer gives a very pleasant description of the baya, under the name of the toddy-bird, in his entertaining "Travels." "Nature, in the rainy season at Bombay, affords us a pleasant spectacle, as well as matter for admiration; for here is a bird that is not only exquisitely curious in the artificial composure of its nest with hay, but furnished with devices and stratagems to secure itself and young ones from its deadly enemy, the squirrel; as likewise from the injury of the weather, which being unable to oppose, it eludes with this artifice; contriving the nest like a steeple-hive, with winding meanders, before which hangs a penthouse for the rain to pass, tying it with so slender a thread to the bough of the tree, that the squirrel dare not venture his body, though his mouth water at the eggs and prey within; yet it is strong enough to bear the hanging habitation of the ingenious contriver, free from all the assaults of its antagonists, and all the accidents of gusts and storms. Hundreds of these pendulous nests may be seen on one tree."

Very different in general arrangement, though still wonderful in its way, is the

NEST OF THE GARRULOUS SYNALLAXIS,

which is a beautifully pendulous structure woven of the lightest materials, and forming a striking feature in the woodland scenery of Bahia, in Brazil. It is a basket-formed nest, built usually in low trees in swampy districts. Its formation is extremely loose and rugged, and it is as a huge picturesque mass, that it appears a beautiful object. Externally, it is built of loose sticks, thrown confusedly together, and resembling somewhat a thick twist of bean stalks flung into the branches from below. The bird which inhabits this nest is one of the most charming songsters of Brazil, where it fills the dark forest with multitudinous tones of gay, plaintive, full-toned, and softened flute music, varying at every few bars, and ranging from a loud, piercing note, to one low, tremulous, warbling, ravishingly sweet, though scarcely audible; in the course of its song passing through all the gradations of expression of which music is susceptible.

In reference to their nests, birds may easily be grouped in classes, as dome-builders, masons, basket-makers, and weavers. Of basket-nests we have had examples in the loxia and the garrulous; the dome-builders are exemplified in the wren, the house-sparrow, and the magpie; all of which build circular nests, with the entrance usually in the side, so that a perfectly doomed roof affords shelter above. Masons are seen wherever swallows "flit on tireless wing," for those birds construct very perfect nests of mud and clay, which they plaster against the walls, until by the labour of beak and tail, they have shaped into the most habitable of mud-huts, each one as good, sometimes better than an Irishman's shanty. Of weaver-birds, we shall instance a few whose nests are more wonderful than the specimens met with in our own woods. Of the latter, the linnet, the greenfinch, and the chaffinch, though somewhat skilled in weaving, are by no means striking examples of this propensity in birds to produce textile fabrics. Take any of the nests of the common small birds which line their nests with hair, and after removing the outer basket of the nest, there will remain a circular piece of hair-cloth, of various workmanship, according to the respective degree of ingenuity of the bird which constructed it. The hedge-sparrow lines its loose basket with



NEST OF THE GARRULOUS SYNALLAXIS.

a very thick stratum of this hair-cloth; and it is surprising to note how regularly the hairs are bent and woven together, so as to present a smooth surface interiorly. The pied wagtail, which builds on the ground, forms a hair-cloth more than half an inch thick; and this is worked together, hair by hair, each regular row of hairs being bound down by simple hairs laid obliquely over them, so that the interior presents a smooth uniform surface.

Among the foreign birds noted for weaving, we may mention briefly the mountain ant-catcher, which weaves a hemispherical structure of dry grass; the American fly-catcher, which weaves together pieces of paper, bits of rotten wood, and fibres of dry grass, using spiders' web for a binding material; and the prairie warbler, which constructs a nest so closely woven as to be almost as fine as silk, and weighing scarcely a quarter of an ounce.

But for special notice we may well select the

BALTIMORE STARLING,

Which forms a kind of purse, woven of downy matter in threads, and suspended to the extreme forks of the tulip, plane, or hickory tree.

"Almost the whole genus of orioles," says Wilson, "belong to America, and, with a few exceptions, build pensile nests.

Few of them, however, equal the Baltimore in the construction of these receptacles for their young, and in giving them, in such a superior degree, convenience, warmth, and security. For these purposes he generally fixes on the high bending extremities of the branches, fastening strong strings of hemp or flax round two forked twigs corresponding to the intended width of the nest; with the same materials, mixed with quantities of loose tow, he interweaves or fabricates a strong, firm kind of cloth, not unlike the substance of a hat in its raw state, forming it into a pouch of six or seven inches in depth, lining it substantially with various soft substances, well interwoven with the outward netting, and, lastly, finishes with a layer of horse-hair, the whole being shaded from the sun and rain by a natural penthouse, or canopy of leaves. As to a hole being left in the side for the young to be fed and void their excrements through, as Pennant and others relate, it is certainly an error: I have never met with anything of the kind in the nest of the Baltimore. Though birds of the same species have, generally speaking, a common form of building, yet, contrary to the usually received opinion, they do not build exactly in the same manner. As much difference will be found in the style, neatness, and finishing of the nests of the Baltimores as in their voices, some appear far superior workmen to others, and probably age may improve them in this, as it does in their colours. I have a number of their nests now before me, all completed and with eggs. One of these, the neatest, is in the form of a cylinder, of five inches diameter, and seven inches in depth, rounded at bottom. The opening at top is narrowed by a horizontal covering to two inches and a half in diameter. The materials are flax, hemp, tow, hair, and wool, woven into a complete cloth, the whole tightly sewed through and through with long horse-hairs, several of which measure two feet in length. The bottom is composed of thick tufts of cow-hair, sewed also with strong horse-hair. This nest was hung on the extremity of the horizontal branch of an apple-tree, fronting the south-east, was visible one hundred yards off, though shaded by the sun, and was the work of a very beautiful and perfect bird. The eggs are five, white, slightly tinged with flesh-colour, marked on the greater end with purple dots, and on the other parts with long hair-like lines, intersecting each other in a variety of directions. I am thus minute in these particulars from a wish to point out the specific difference between the true and bastard Baltimore, which Dr. Latham and some others suspect to be only the same bird in different stages of colour.

"So solicitous is the Baltimore to procure proper materials for his nest, that, in the season of building, the women in the country are under the necessity of narrowly watching their thread that may chance to be bleaching, and the farmer to secure his young grafts, as the Baltimore, finding the former, and the strings which tie the latter, so well adapted for his purpose, frequently carries off both; or should the one be too heavy, and the other too firmly tied, he will tug at them a considerable time before he gives up the attempt. Skeins of silk and hanks of thread have been often found, after the leaves were fallen, hanging round the Baltimore's nest, but so woven up and entangled as to be entirely irreclaimable. Before the introduction of Europeans no such material could have been obtained here; but with the sagacity of a good architect he has improved this circumstance to his advantage, and the strongest and best materials are uniformly found in those parts by which the whole is supported."

Charming is the story told of another of these artificers, the

INDIAN SPARROW,

Whose little nests of grass-cloth are nightly illuminated with glow-worms, which are there impaled by the female to light her lover to her nest. True, there is something painful in the crucifixion of these poor glow-worms, which are collected and stuck on thorns to serve as lamps inside the nest; but divesting the mind of that, the story is full of a delicate fancy, fit indeed for fairyland. "In Hindostan," says Sir William Jones, "the bird is exceedingly common. He is sensible, faithful, and docile, never voluntarily deserting the place where his young are hatched; but very much attached to man, and very susceptible of teaching. In a state of nature he generally builds his nest on the highest tree he can find, especially on the Palmyra, or on the Indian fig-tree, and he prefers that which happens to overhang a well or a rivulet; he makes it of grass, which he weaves like cloth, and shapes like a bottle, suspending it firmly on the branches, but so as to rock with the wind, and placing it with its entrance downward to secure it from the birds of prey. His nest usually consists of two or three chambers, and it is popularly believed that he lights them with fire-flies, which he is said to catch alive at night, and confine with moist clay or with cow-dung. That such flies are often found in his nest, where pieces of cow-dung are also stuck, is indubitable; but, as their light could be of little use to him, it seems probable that he only feeds on them. He may be taught with ease to fetch a piece of paper, or any small matter that his master points out to him. It is an attested fact, that if a ring be dropped into a deep well, and a signal be given to him, he will fly down with amazing celerity, catch the ring before it touches the water, and bring it up to his master with apparent exultation: and it is confidently asserted, that if a house or any other place be shown to him once or twice, he will carry a note thither immediately, on a proper signal being made. The young Hindoo women at Benares and in other places wear very thin plates of gold, called *ticas*, slightly fixed, by way of ornament between their eyebrows, and when they pass through the streets it is not uncommon for the youthful libertines, who amuse themselves with training these birds, to give them a signal which they understand, and send them to pluck the pieces of gold from the foreheads of their mistresses, which they bring in triumph to their lovers."

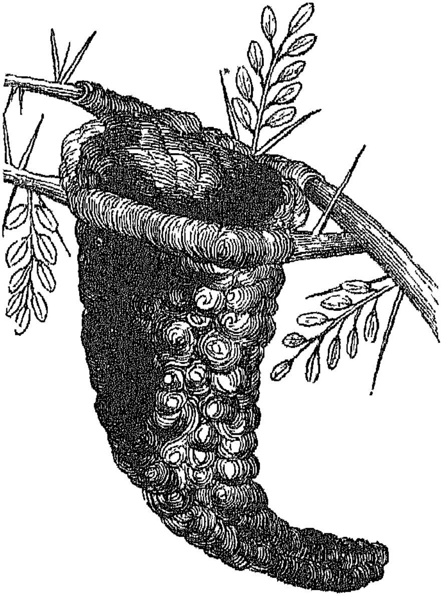
It is interesting to know that Professor Rennie has received ample confirmation of this strange habit of the Indian sparrow. In his amusing work on "Bird Architecture," he quotes from the letter of a gentleman, long resident in India, who had frequently examined these nests, and invariably found one or more glow-worms fixed to its inside, with a sort of glutinous clay; while there seemed every possible proof that these glow-worms were not placed there for food, but really to illuminate the nest. In this respect at least, Oriental romance is not to be charged with fictitious extravagance.

A very pretty woven nest, figured and described by Vaillant, in his splendid work on African birds, is known as that of

THE TCHITREC,

of which he gives the following account—

"It is, I believe," says he, "the nest of the tchitrec; for though I have never captured the bird of this species on the nest, and am not therefore certain of the fact, my good Klaas, a faithful if not a profound observer, assured me that it was. In one of our journeys through a wood of mimosas, in the country of the Caffres, he discovered and brought me this nest, having seen, he said, and particularly observed a male and female tchitrec occupied in constructing it. It is remarkable for its peculiar form, bearing a strong resemblance to a small horn suspended, with the point downwards, between two branches. Its greatest diameter was two inches and a half, and gradually diminishing towards the base. It would be difficult to explain the principle upon which such a nest had been built, particularly as three-fourths of it appeared to be entirely useless and idly made; for the part which was to contain the eggs, and which was alone indispensable, was not more than three inches from the surface. All the rest of this edifice, which was a tissue closely and laboriously woven of slender threads taken from the bark of certain shrubs, seemed to be totally useless. The interior of the nest was not furnished with any sort of soft material, such as down, wool, or hair, but as the female had not laid her eggs when Klaas brought it to me, it is probable that the nest was not quite finished; a fact, indeed, proved by the birds being still at work at the time."



NEST OF THE TCHITREC.

The yellow-hammer has sometimes been known almost to rival the tchitrec in the beauty of its woven nest. This nest, however, is rather of the basket order, and is lined only with the woven material. Grahame describes it most truly—

"Up from the ford, a little bank there was
With alder copse and willow overgrown,
Now worn away by mining winter floods;
There, at a bramble root, sunk in the grass,
The hidden prize, of withered field straws formed,
Well lined with many a coil of hair and moss,
And in it laid five red-veined eggs, I found."

The goldfinch is another of our songsters who shows some expertness in weaving. The nest of the goldfinch is one of the prettiest produced in this country; the close cup of which it consists being beautifully felted of moss and wool, and lined within by a woven texture of wool and down. The roundness of the outline, and the closeness of the woven texture, are most workman-like, and accurately described by Grahame as constructed chiefly of the willow and cammock down—

"The goldfinch weaves, with willow down inlaid
And cammock tufts, his wonderful abode;
Sometimes, suspended at the limber end,
Of plane-tree spray, among the broad-leaved shoots,
The tiny hammock swings to every gale:
Sometimes in closest thickets 'tis concealed;
Sometimes in hedge luxuriant, where the briar,
The bramble, and the plum-tree branch,
Warp through the thorn, surmounted by the flowers
Of climbing vetch and honeysuckle wild."

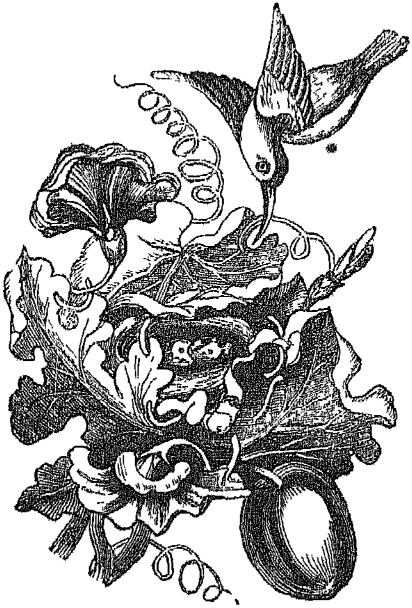
These nests, however, are far surpassed in manufacturing details by the

NEST OF THE TAILOR BIRD,

Which is formed after the most approved processes of our own west-end clothiers. The bird is truly a tailor-bird, and not a wretched burlesque of the tailoring faculty, and the construction of the nest is accomplished by the same means which the experienced tailor, cross-legged on his board, must use.

"The tailor-bird," says Darwin, "will not trust its nest to the extremity of a tender twig, but makes one more advance to safety by fixing it to the leaf itself. It *picks up a dead leaf, and sews it to the side of a living one*, its slender bill being its needle, and its thread some fine fibres; the lining consists of feathers, gossamer, and down; its eggs are white; the colour of the bird light yellow; its length three inches; its weight three-sixteenths of an ounce; so that the materials of the nest and the weight of the bird are not likely to draw down a habitation so slightly suspended. A nest of this kind is preserved in the British Museum."

Since Darwin wrote, two more of these nests have been added to the one in the Museum, so that three specimens may now be seen there. There is every necessary confirmation of the wonderful manner in which the nest is produced: and if any doubt lingered with us, the testimony of so acute and careful a traveller as Forbes, would speedily expel such from our minds. Comparing the nest of the tailor-bird with that of the baya, he says—"Equally curious in the structure of its nest, and far superior in the variety and elegance of its plumage, is the tailor-bird of Hindostan, so called from its instinctive ingenuity in forming its nest: it first selects a plant with large leaves, and then gathers cotton from the shrub, spins it to a thread by means of its long bill and slender feet, and then, as with a needle, sews the leaves neatly together to conceal its nest. The tailor-bird resembles some of the humming-birds

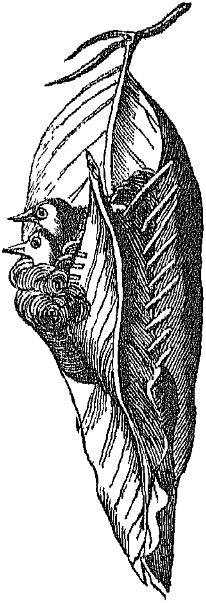


TAILOR-BIRD PREPARING HER NEST.

at the Brazils in shape and colour; the hen is clothed in brown; but the plumage of the cock displays the varied tints of azure, purple, green, and gold, so common in those American beauties. Often have I watched the progress of an industrious pair of tailor-birds, in my garden, from their first choice of a plant, until the completion of the nest and the enlargement of the young."

Mr. Alfred Smee says he has two of these nests, which are formed of leaves pierced regularly, and sewn together with wool, by a regular "in and out stitch."

Returning to felted and woven nests—having left them only to instance an extension of the same ingenuity—we come to the



YOUNG OF TAILOR-BIRD.

NEST OF THE CAPE-TIT,

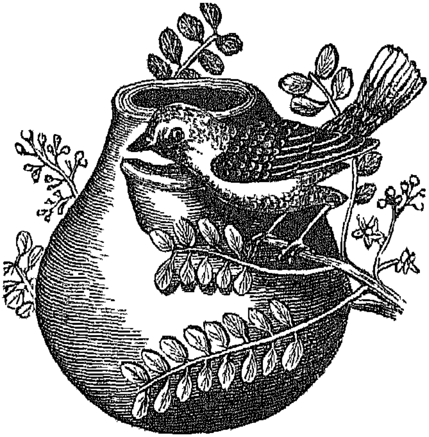
Which is a sort of woollen bottle. This bottle has a narrow neck, and on the outside is a small pocket which serves the male for a lodging, while the female sits in the chief room. When the female has left the nest, the male, if he desire to follow her, beats violently with his wings against the sides of the nest, and the edges, coming in contact with each other, unite, and entirely close up the entrance. By means of this strange contrivance, these birds protect their young from voracious insects and animals which are likely to do them injury.

Another instance of artistic arrangement, combined with mechanical skill, is seen in

THE BASKET-NEST OF THE EUPLECTES FLAVICEPS,

Which Mr. Smee describes in his work on "Instinct and Reason." He says, "it is so like a basket, that, curiously enough, it has a handle to it like the basket known by the sea-side by the name of a cobble. It is composed, not of twigs, but of a coarse grass, and the handle is so interwoven with the whole mass as to cause us to wonder at its construction, I cannot conceive for what purpose this handle can be made; but not the least curious part of the structure is the finish given to the handle by the grass being wound round and round it."

> "Behold a bird's nest!
> Mark it well, within, without!
> No tool had he that wrought; no knife to cut,
> No nail to fix, no bodkin to insert,
> No glue to join: his little beak was all:
> And yet how neatly finish'd! What nice hand,
> With every implement and means of art,
> Could compass such another?"



NEST OF THE CAPE-TIT.

Two very wonderful nests now remain to be noticed; the first is the

EDIBLE NEST OF THE SALANGANE.

The salangane is a kind of swallow found in China, Cochin-China, the Sunda isles, and Sumatra. The nest of this bird is that employed in the famous bird-nest soup, respecting which so many extravagancies have been told. The real history of the bird and nest has been involved in considerable doubt, though recent travellers have pretty well unravelled the mystery. The earliest modern account of these nests is that furnished by Bontius, in his "India Orientalis," who says that the birds compose their nests of certain glutinous matters with which the froth of the sea supplies them. The physician Redi, in his "Experimenta Circa," 1685, says, that they are novelties upon which the epicures set an adventitious value; while Kircher, Du Halde, Kempfer, and others, have dealt in conjectures more or less worthy of consideration.

A genuine account of the birds and their nests is given by Sir G. Staunton, in "Macartney's Embassy to China." He says—

"In the Cass, a small island near Sumatra, we found two caverns running horizontally into the side of the rock, and in these were a number of those birds' nests so much prized by the Chinese epicures. They seemed to be composed of fine filaments, cemented together by a transparent viscous matter, not unlike what is left by the foam of the sea upon stones alternately covered by the tide, or those gelatinous animal substances found floating on every coast. The nests adhere to each other and to the sides of the cavern, mostly in horizontal rows, without any break or interruption, and at different depths, from fifty to five hundred feet. The birds that build these nests are small grey swallows, with bellies of a dirty white. They were flying about in considerable numbers, but were so small, and their flight was so quick, that they escaped the shot fired at them. The same sort of nests are said to be also found in deep caverns at the foot of the highest mountains in the middle of Java, at a distance from the sea; from which source it is thought that the birds derive no materials, either for their food or the construction of their nests, as it does not appear probable they should fly in search of either over the intermediate mountains, which are very high, or against the boisterous winds prevailing thereabouts. They feed on insects, which they find hovering over stagnated pools between the mountains, and for the catching of which their wide opening beaks are particularly adapted. They prepare their nests from the best remnants of their food. Their greatest enemy is the kite, who often intercepts them in their passage to and from the caverns, which are generally surrounded with rocks of grey limestone or white marble. The colour and value of the nests depend on the quantity and quality of the insects caught, and perhaps also on the situation where they are built. Their value is chiefly ascertained by the uniform fineness and delicacy of their texture, those that are white and transparent being most esteemed, and fetching often in China their weight in silver.

Those nests are a considerable object of traffic among the

Javanese, many of whom are employed in it from their infancy. The birds, after having spent nearly two months in preparing their nests, lay each two eggs, which are hatched in about fifteen days. When the young birds become fledged it is thought the proper time to seize upon their nests, which is done regularly three times a year, and is effected by means of ladders of bamboo and reeds, by which the people descend into the caverns; but when these are very deep, rope-ladders are preferred. This operation is attended with much danger, and several perish in the attempt. The inhabitants of the mountains generally employed in this business begin always by sacrificing a buffalo, which custom is observed by the Javanese on the eve of every extraordinary enterprise. They also pronounce some prayers, anoint themselves with sweet-scented oil, and smoke the entrance of the cavern with gum-benjamin. Near some of the caverns a tutelar goddess is worshipped, whose priest burns incense, and lays his protecting hands on every person preparing to descend. A flambeau is carefully prepared at the same time, with a gum which exudes from a tree growing in the vicinity, and which is not easily extinguished by fixed air or subterraneous vapours."

The last example is perhaps the most wonderful of all, and certainly suggests grave considerations for the inquirer into the ways of instinct and intelligence in brutes. As we are to deal with facts, we must expect in the reader a large stock of faith to enable him to accept the conclusions of accurate observers who record what they have seen, and make no demands on imagination for any of the links in the narrative. We are to describe what may be termed

THE INCUBATING OVEN OF THE BRUSH TURKEY,

which affords a fine instance of the adoption of true scientific principles by a bird whose education was not given it in the chemical class room, but which instinctively turns chemist, and hatches its eggs in the most artificial manner. Our account of this bird we abridge from Mr. Broderip's work on Zoology, just published by Messrs. Parker.

The visitors to the garden of the Zoological Society of London, in the Regent's Park, may see a plain-looking, sombre bird, with a considerable share of tail, of a size between a common fowl and a curassow, walking and picking about as if it were looking for something it ought to find but cannot. It is at present in the great aviary on the south side, on the right after entering the gate from the road. This is the 'brush turkey' of the colonists of New Holland, the 'wealth' of the aborigines of the Namoi. If any one should inform an uninitiated visitor that the bird before him never sits upon its eggs, but plants them in a hotbed, as a man might plant cucumber and melon seeds, he would be taken for the most notorious fabulist since the days of Bidpai. If he should enlighten the neophyte father, and instruct him that the birds collect the materials for this hotbed themselves, and abide their time till the fermentation has reached the proper point, till, like the patent incubator, it is fit for hatching the eggs, he would stand a very good chance of being set down as a member of the great family of Munchausen of adventurous and marvellous memory. But nothing is more true.

The 'brush turkey' belongs to a family of birds—or, if you wish to be hyper-critical, learned reader, a sub-family—which never incubate, but having collected vegetable materials—which they know *will* heat to a proper point without, like an ill-saved hayrick, bursting out into combustion, or getting up into a sullen baking point, would be equally destructive of the vital principle—leave their eggs to the genial warmth of this half-natural, half-artificial mother.

It is in the reproduction of this species that the anomalous proceedings of the bird are manifested. Collecting gradually a quantity of decaying vegetables, the bird makes a hotbed. Several weeks are patiently employed in bringing the materials together, till, at length, a mound, consisting of a congeries of from two to four cart-loads, is formed. But it must not be considered as the labour of an individual, or of a pair, for many join in the work. When once established, a forcing bed of this description does duty for many years; that is, the same site is resorted to, and as the lowest part decomposes, the birds superadd an additional supply previous to depositing their eggs.

In the construction of the most elaborate of bird's-nests, the bill is the principal instrument of action, the feet performing a very subordinate part in the operation. In the instance before us the case is reversed. The foot is the agent in collecting and depositing; the bill is not used for those purposes at all. The bird grasps a quantity in its foot, throwing it backwards to the common centre of deposit. The surface of the adjoining ground is thus cleared for a considerable distance so completely that hardly a leaf or blade of grass is left. When this pyramidal vegetable mound has had a sufficient time to heat, so as to be of the proper temperature, the large eggs are inserted, not side by side, as in ordinary cases, but planted at regular distances from each other, some nine or twelve inches apart, perfectly upright, and with the large end downwards, each egg being buried at nearly an arm's depth. They are then covered up and left till they are hatched.

Now comes the question, How do the young birds effect their escape from the tomb where they are literally buried alive?

This seems to be a mystery. Some natives told Mr. Gould that they emerged without aid: others declared that the old birds, when the fulness of time was come, scratched down to their offspring, and set them free.

Mr. Gilbert found this megapode confined almost exclusively to the dense thickets near the sea-beach; nor does it appear to be met with far inland, except up the banks of creeks. The birds go in pairs or singly, feeding on the ground, on roots for the most part, which the powerful claws of their great feet enable them to scratch up, and on seeds, berries, and insects, especially the large coleopterous kinds of the latter. They are not easily procured, and though the whirring of their wings as they fly away is often heard by those who approach their haunts, the birds themselves are seldom seen. The flight is heavy, and does not seem capable of being long sustained. When first disturbed, the jungle fowl invariably makes for a tree, and as soon as it there alights, stretches out its head and neck in a straight line with the body, and remains motionless in that attitude. When thoroughly roused and alarmed it flies horizontally and laboriously for about a hundred yards, with its legs hanging down. Mr. Gilbert did not hear any note or cry; but the natives described and imitated it, and according to them it clucks much in the fashion of a common domestic fowl, the cluck ending in a peacock-like scream. He observed that the birds continued to lay from the end of August to March, when he left that part of the country, and if the natives are to be believed, an interval of four or five months, including the driest and hottest portion of the year, occurs between their breeding seasons. Mr. Gilbert remarks, that the composition of the mound seems to influence the colouring of a thin epidermis, with which the eggs are invested, and which readily chips off, showing the shell to be white. Thus, eggs deposited in a black soil are externally of a dark reddish brown; those placed in sandy hillocks near the beach present a dirty-yellowish hue. They differ in size considerably, but are all of the same form, with both ends equal. The average size may be taken at three inches five lines long, by two inches three lines broad.

SCULPTURES.

The art of sculpture has been practised from the earliest ages. Probably its practice was anterior to that of drawing, and its early history is almost a part of the history of the religions of the ancients. In its large sense sculpture may be taken to signify, the representation of form in any material—wood, metal, stone, clay, plaster, have all been used. Some of the ancient metal figures were cast, so as to give colour to the figures. Thus, silver has been used to represent the pallid hue of death; and a mixture of bronze and iron, to indicate the glow of the skin. There was a statue of Augustus formed of amber, and the figures used in funereal ceremonies were sometimes composed of odoriferous gums and spices. We shall however only thus indicate these conceits of art, and confine ourselves to describing a few of those statues which may be taken as examples of the highest perfection, which has as yet been attained.

The finest example of manly grace which sculptors have bequeathed to us, is to be found in the wonderfully beautiful and graceful statue of

THE APOLLO BELVIDERE.

This splendid specimen of ancient art was found toward the end of the fifteenth century, in the ruins of the ancient Antium at the Capo d'Anzo, about fifteen leagues from Rome. It was purchased by Pope Julius the Second, and by him placed in the Belvidere, in the Vatican. The figure is about seven feet high, and with the exception of a loose cloak, perfectly naked. When found, the left hand and right arm had been broken off, and those parts were restored by Giovanni Angelo da Montorsoli, a pupil of Michael Angelo. In its present state it represents the god after he has just discharged an arrow at the serpent Python, waiting to watch the effect of his shaft.

Apollo was the most beautiful of all the male divinities of Greece. The highest embodiment of grace to which the most intellectual and artistic people of ancient times advanced. He was the god of music, prophecy, medicine, and archery, the protector of the Muses, and the deity of the sun. In the beautiful Homeric hymn to Apollo, he is made to say, "The harp, the curved bow be mine, and I will proclaim to men the unerring counsel of Zeus." In the personification of Apollo, the Greeks combined the ideals of intellectual beauty and physical grace; and marvellously does this statue represent these qualities. When our great tragic actress, Mrs. Siddons, visited the Vatican, after standing in wrapt admiration before it, she broke out with an enthusiastic apostrophe to the beauty of the mind which could embody such a magnificent conception.

For some time the Apollo was supposed to be a Grecian production, and specifically attributed to Phideas. There is, however, no proof of this, and the evidence seems to lean to its being created in the time of Nero. It is not the least wonderful fact in the history of art, that that monster who spared none—whose lusts, passions, and appetites, were his sole guide, was an enthusiastic admirer of the beauties of art. The following passage of Homer's Hymn is supposed to be that which suggested the idea to the sculptor.

"Apollo's bow, unerring sped the dart,
And the fierce monster groaned beneath the smart;
Tortured with pain, hard breathing on the ground,
The serpent writhed beneath the fatal wound.
Now here, now there, he winds amidst the wood,
And vomits forth his life in streams of blood.
Rot where those liest, the exulting archer said,
No more shall man thy vengeful fury dread;
But every hand that tills earth's spacious field,
Her grateful offerings to my shrine shall yield,
Not Typha's strength, nor fell Chimæra's breath,
Can now protect thee from the grasp of death,
There, on the damp black earth, in foul decay,
Rot, rot to dust, beneath the sun's bright ray."

Born of poetry, it is almost impossible, without resorting to the language of poetry, to do justice to the beauties of this statue; and, therefore, we close our description of it by a sketch from a master hand. Thus sung Lord Byron, in Childe Harold,

"The lord of the unerring bow,
The god of life, and poesy, and light;
The sun in human limbs arrayed, and brow
All radiant, from the triumph in the fight;
The shaft has just been shot—the arrow bright,
With an immortal's vengeance;—in his eye
And nostril beautiful disdain, and might,
And majesty, flash their full lightnings by,
Developing in that one glance the Deity."

Parallel with the Apollo, as the perfect representation of female elegance is

THE VENUS DE MEDICI,

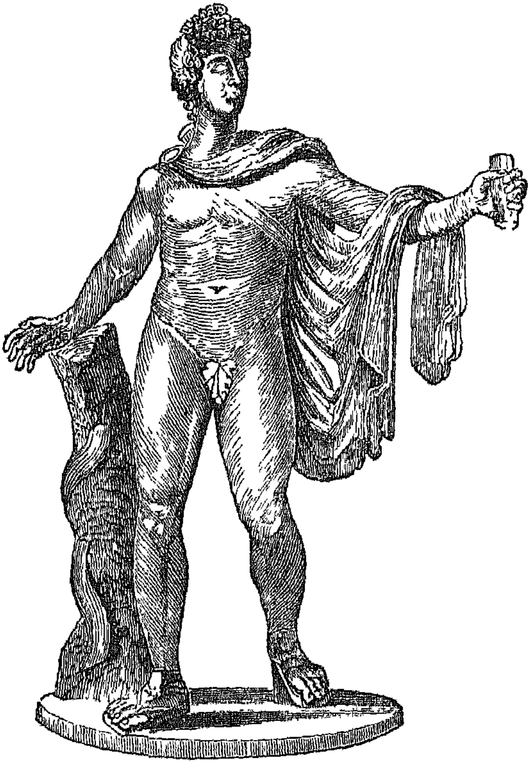
Which is undoubtedly a relic of ancient Greek art. It is variously stated to have been found at the villa of Hadrian, near Tivoli, and the forum of Octavia to Rome; and on the plinth was the name of the artist, "Cleomenes, the son of Apollodarus of Athens," who is known to have lived about two hundred years before the Christian era. At the time of its discovery, it was deficient of the right and the lower part of the left arm, which have been restored, and the plinth was so damaged that it was replaced by a copy. In the sixteenth century it stood in the Medici Gardens at Rome; about 1680, it was carried to Florence. When the victorious French plundered Italy of the best of her works of art, it was taken to Paris, and was restored to the Imperial Gallery there (called the Tribune), after the success of the Allied arms. The figure is of Parian marble, four feet nine inches in height, and exquisitely proportioned. Its rounded limbs show the greatest beauty of the female form, and have furnished models for the sculptors of after ages. The face, however, although beautiful, is deficient in charm of expression; and an attempt at lightness and elegance has reduced the head to a size so small as to be only compatible with idiotcy. Still there is a graceful repose, and a life-like aspect about the whole to which the chiselled marble very seldom reaches, justifying the opinion that this is one of the finest statues of all time.

Sculpture is more adapted to the representation of quiescent, or gently moving forms, than those in energetic action, but

THE GROUP OF THE LAOCOON.

shows it realizing the struggles of despair. This group was found on the old Esquiline Hill, at Rome, behind the baths of Titus. Pliny, who speaks of it as the finish of all works of art, asserts that it was the joint effort of three sculptors of Rhodes, Ajesander, Polydorus, and Athenodorus, who were employed by the Emperor Titus. The subject is the destruction of Laocoon, the priest of Neptune, and his two sons, by two immense sea-serpents, for disobeying Minerva. Virgil thus describes the incident—

> "Laocoon, Neptune's priest, by lot that year,
> With solemn pomp then sacrificed a steer;



THE APOLLO-BELVIDERE.

When, dreadful to behold, from sea we spied
Two serpents, ranked abreast, the seas divide,
And smoothly sweep along the swelling tide.
Their flaming crests above the waves they show,
Their bellies seem to burn the seas below;
Their speckled tails advance to steer their course,
And on the sounding shore the flying billows force.
And now the strand, and now the plain they held,
Their ardent eyes with bloody streaks were filled,

Their nimble tongues they brandished as they came,
And licked their hissing jaws that sputtered flame.
We fled amazed; their destined way they take,
And to Laocoon and his children make·
And first around the tender boys they wind,
Then with their sharpened fangs, their limbs and bodies grind.
The wretched father, coming to their aid
With pious haste, but vain, they next invade:
Twice round his waist their winding volumes roll'd,
And twice about his gasping throat they fold,
The priest, thus doubly choked, their crests divide,
And towering o'er his head in triumph ride."

The group differs in some respects from the text of Virgil. In the centre is the father, whose form, as he struggles despairingly, is the embodiment of manly beauty and strength. The serpent grasped by the neck is just fastening on his side. The son on his right, encircled by the folds, has already felt the fangs of the other snake, and as his tender frame yields to the pressure, and the swift poison courses through his veins, casts up a look of helpless agony to his father. The other boy, on the left, has not yet felt the sting, but raising his hand and head amid the serpent folds, appears to utter an affrighted cry for help. The expression of the entire group is at once terrific and admirable. The spectator sees at once that the struggles are those of hopeless despair, and the faces tell a tale of almost more than mortal terror.

Two undoubted remains of Grecian genius, which formerly adorned the magnificent Parthenon at Athens, are

THE THESEUS AND THE ILISSUS,

Now in the Elgin marble room of the British Museum. The figure of Theseus, the Athenian hero, is that of a colossal giant reposing on a rock covered by a lion skin. It is extraordinary for the breadth and power which it exhibits, and though mutilated by the loss of both feet and hands and part of the nose, conveys the character of the demi-god of old. There is the compact head, the fierce grin, the massive brow, and the decided features ascribed to the old athletæ, and the vast trunk, ponderous limbs, and swelling muscles, are life-like in their apparent power. There are all the marks of that courage and vigour which made men great when the broadest laws were written on the edge of the sword.

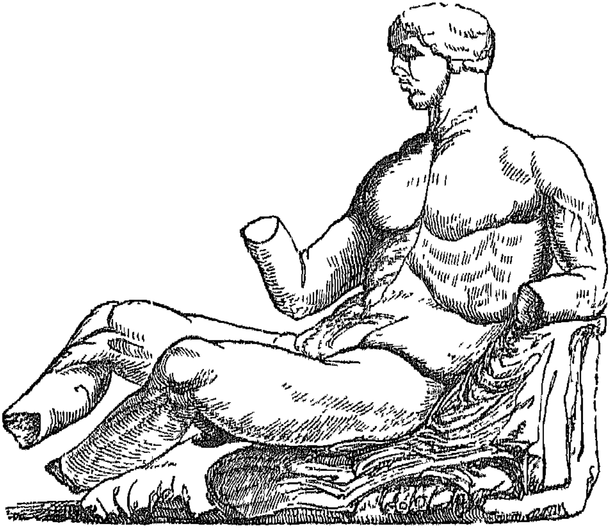
The Ilissus, supposed to represent a river god, is a figure of another mould. It is still more mutilated than the Theseus, having lost its head in addition to its hands and feet. Its prevailing characteristic is elegance rather than strength. As it stretches its length along, the contour of its limbs and the folds of the drapery which fall from it, as the body is raised upon one hand, seem to imitate the flow of waves, so softly and gently does one line blend into another. In modern art, perhaps, the Hercules and Lichas of Conova are the only statues which can compare, for vitality and beauty, with these fragments of the achievements of Greece.

THE DYING GLADIATOR

Is a memorial of that time when savage barbarism mingled with luxurious civilization. In Rome, the mistress of the known world, Rome, with her vast works of art, her invincible legions, and her patriotic people, rose that immense temple of Moloch, the Amphitheatre. There grave men, whose words are yet appealed to as the standards of wisdom; orators and poets, whose bursts of eloquence still are quoted to admiring senates; and tender women, the best mothers and daughters of the city, came to a banquet of blood, as to a spectacle. There, on the blood-stained arena, they saw wild beasts tear each other in furious combat, and there they looked on with unpitying faces and unwavering eye, while slaves made in war were forced to fight to the death for the amusement of their unrelenting conquerors. There has been such a scene, and this statue tells the tale. The fight is over, and while the conqueror is cheered, there lies the victim, thrown down upon his shield, his weakening hand scarce keeps his head from falling prone on the earth. The tide of life is ebbing from that ghastly wound upon the breast, and on the face, blending with the pain, the faintness, the shame of defeat, we can trace the memories of the past crowding themselves into the last moments of existence. But nothing we can say will so well realise the conception as the beautiful lines of one of the greatest poets.

"I see before me the gladiator lie;
He leans upon his hand; his manly brow
Consents to death, but conquers agony,
And through his side the last drops, ebbing slow,
From the red gash fall heavy, one by one,
Like the first of a thunder-shower; and now
The arena swims around him,—he is gone
Ere ceased the inhuman shout which hailed the wretch who won.

"He heard it, but he heeded not—his eyes
Were with his heart, and that was far away;



THESEUS.

He recked not of the life he lost, nor prize,
But where his rude hut by the Danube lay,
There were his young barbarians at play,
There was their Dacian mother—he their sire,
Butchered to make a Roman holiday—
All this rushed with his blood—shall he expire,
And unavenged? Arise, ye Goths, and glut your ire.

Verily that old Rome, great and generous as she was, fell under a just retribution when the barbarians she so oppressed arose, and, breaking the chain with which she bound the world, scattered her power to the winds, leaving to other ages her greatness as an example, and her fate as a warning.

After the fall of the Roman Empire, a period of barbarism elapsed, during which the arts were lost. When they appeared again it was in Italy, and the examples of its revival, to which we are proceeding, belong to that wondrous fifteenth century, when the mind of the European world aroused itself from the slumber of ignorance and the dream of superstition. Among the foremost sculptors, as well as painters of the world, is that almost universal genius, Michael Angelo. He disdaining to follow the rules of Greek art, struck out a new school for himself. We find but little of nerve beauty in the productions of his chisel, but like the mind of their author, they are massive in their power, and fearful in their energy. One of the figures which embodies these qualities is that of

JONAH,

Which decorates the Sistine Chapel at Rome. A comparison of this statue with the Jonah of West will serve to exhibit in a striking light Michael Angelo's genius. West, selecting the moment when the whale cast the prophet upon dry ground, drew Jonah kneeling on one knee, with outstretched arms and a face expressive of wonder and praise, but the embodiment wants force and telling individuality. In Michael Angelo's conception there is no formalism—no conventionalism. No time is given to assume the kneeling position. The splendid, vigorous figure is *thrown*, not *placed*, in an attitude; and on the face the emotion of surprise is struggling with reviving intelligence and kneeling adoration.

Perhaps, however, the greatest, as well as the most characteristic of all Michael Angelo's sculptural efforts, is that representing Lorenzo de Medici, duke of Urbino, in the Chapel of the Church of San Lorenzo. This duke, of whom it is said, "had an evil spirit assumed the human shape, to propagate mischief, he could not have done better," belonged to the same family as the Pope Clement VII., for whom the statue was completed. That old artist had the spirit of truth in him. Had the duke been the ancestor of a hundred popes, Michael Angelo would have been truthful as he was. He gave the noble his true character. The marble is so thoughtlike, that in Italy it is known as "The Thought," but it is evil thought. Spectators almost shrink from that noble form, which might stand for Milton's Satan, and look with a sensation of fear upon the shaded face peering from beneath the bonnet-like helmet, so Satanic is its expression. If Leigh Hunt ever saw it, it might have suggested that portrait of the angel of death, which he has given us in his poem of "The Inevitable"—

> "He wore a hood, from beneath which there shone,
> Full on the guest, and on the guest alone,
> A face not of this earth, half veiled in gloom
> And radiance, and with eyes like lamps of doom;
> Which ever, as he came, before him sent
> Rebuke, and terror, and astonishment."

Rogers the poet says of it, that it is at once "the most real and unreal thing which ever came from the chisel." His poetry, where he alludes *to it*, conveys a still better impression of its effect.

> "There from age to age
> Two ghosts are sitting on their sepulchres—
> *That* is the Duke Lorenzo!—Mark him well!
> He meditates, his head upon his hand,
> What from beneath his helm-like bonnet scowls?
> Is it a face, or but an eyeless skull?—
> 'Tis lost in shade, yet, like the basilisk,
> It fascinates, and is intolerable."

While the name of the "divine Raffaelle" is known to almost every one as that of the king of painters, comparatively few are aware that he was also a sculptor. One of the most beautiful productions of his genius in that department of art, is

THE DOLPHIN AND CHILD,

in the collection at Down Hill, in Ireland. Though there are several models by Raffaelle, this is the only work in marble which can with any certainty be traced to his hand. It represents a child, of the size of life, borne upon the back of a dolphin. The repose and beauty of the sculpture are perfect. The head of the boy is thrown back, the arm drops by the side; the body yields gently to the swelling outline of the fish, and the legs are lightly crossed. It has been taken to represent a wounded child, but there is nothing to confirm that supposition in its appearance. It seems like the still, quiet, deep sleep of happy infancy. We are not aware from what incident or passage Raffaelle took his idea; probably it was from the graceful fable of the kindly fish being prone to giving its support to favoured mortals sinking in the treacherous waves. If the gods of Olympus ever were attracted by innocence and beauty, to send the dolphin on such errands of mercy, such a form as is here sculptured was worthy of their care. Its excellence justifies us in saying, that had Raffaelle devoted himself to sculpture as he did to painting, he would have emulated the highest efforts of Grecian skill.

PICTURES.

A PAINTING is a poem addressed to the eye. It has just the same effect on the mind as a poem. Both are representations, but both do something more than represent. Poets and painters must alike copy nature without servility. Mere literal truth will not do, when something more than imitation is necessary. It must be wedded to associations and spiritualised—wedded to beautiful associations and made to suggest the possible, which alway lies beneath the real. Precisely in proportion as a picture does that it is great. Of course there must be a certain degree of mechanical skill in execution, and of chemical knowledge in the preparation of colour, but there is nothing wonderful in those accomplishments. They are acquired and practised daily in the common walks of life. The faculties which really demand admiration, are those qualities of the mind which enable the artist-poet, standing before his bare canvas, to forecast such a face, such a figure, or such a group, as shall embody a sentiment by expression, tell a history with all the force of action, and carry home its tale of joy or woe, endurance or stern resolve, straight to the heart of the spectator. This wonderful power is not to be acquired by study, or obtained by practice It is a gift, not an art. It is the inspiration of genius vouchsafed only to a few who are endowed with creative power; and thus it is, that while there are thousands of careful painstaking men who produce correct copies of the outer forms of nature, there are but few who have the power to make those forms instinct with her inner spirit.

We intend, in this article, to take a few of the greatest pictures, which stand out prominently from the level ground of mediocrity, and to describe their beauties. We turn first to the Italian school. There is some wonderful sympathy between mind and matter too subtle to be grasped and too mysterious to be comprehended. The action of this has made sunny, joyous, fertile Italy, the chosen land of art and song. It is her sons, whose minds are pre-eminently endowed with the glowing warmth of the south, the clearness of its blue skies, and the ideality which hangs around their classic birthplace. Their language is a spoken melody, and the forms which meet their eyes those of beauty. Among them was born the greatest painter of ancient or modern times. Raffaello Saugeo, or as he is more commonly called, Raffaelle, was born on Good Friday, 1483, and died on Good Friday, 1520; a short life; but in that brief space of thirty-seven years, he did more for the glory of his art than any other man ever effected.

The work which we have selected of this master is one from that series of Cartoons, which may be said to furnish a compendium of the early history of the promulgation of

Christianity. It is scarcely necessary to recall to the minds of our readers that awfully impressive portion of the Scripture narrative, which tells of

THE DEATH OF ANANIAS.

After the miraculous preaching of Pentecost, and the cure of the cripple by St. Peter, we read how the Christian band daily multiplied, by the accession of new converts; prompted by the same spirit of brotherhood, they voluntarily brought their wealth into the common stock. "They were of one heart, and one soul, and had all things in common." Among these proselytes was one Ananias, who, while he was willing to participate in the advantages of the arrangement which he pretended to enter into, avariciously kept back part of his own possessions, while he gave the rest to keep up the appearance of sincerity. He sold a piece of land, and brought a portion of the money, and laid it at the apostles' feet, asserting that it was all. Then came the punishment. This is the moment which Raffaello seized to delineate in his grand picture, and how beautifully, yet simply, it tells the whole story.

The assembly is beneath a humble roof, as is consistent with the poverty and simplicity of the early teachers of the faith; but as becomes their elevation and importance, the apostles are pictured as standing upon a slightly raised platform. On one side are converts bringing in their offerings; on the other the poor brethren, to whom the apostles are distributing gifts out of the plenty of the rich; in the centre stands the Apostolic Peter, with his hand extended in the attitude of denunciation, and the high wisdom of his face made severe with a look of calm, passionless sternness. The first figure which meets the eye is that of Ananias, who is extended upon the floor, in the agonies of death. The head has fallen upon the shoulder; the eye has lost the power of sight; the limbs are convulsed with spasmodic throes; the face has an expression of pain and anxiety. There is a feeble attempt to support the weight of the falling body upon the nerveless wrist, but the spectator sees at once that it is ineffectual, and almost pauses for the final fall. You perceive, too, that the stroke has fallen upon a strong man, in the tide of health and energy. It is a spectacle of sudden death "by the visitation of God." That is one part of the story.

Another portion of the narrative, which the picture tells with startling vividness, is the suddenness with which the catastrophe occurred. It has evidently come into the midst of the group an unexpected judgment, quick speeding as the lightning flash. Beside the apostles upon the platform, and the inspired prophetic denouncer of the doom, few are as yet aware of it. Most are engaged with one another. Sapphira, the wife, all unconscious, is approaching in the back ground, ready to aid in the deception of the dying wretch. One young man, on one side, recoils with startled horror; on the other, the two disciples bend over the quivering frame of Ananias, with looks in which pity and a sense of justice are powerfully depicted. It appeals to the mind at once as no prepared scene, no dramatic effect, carefully, but with all the natural force of unprepared, unpremeditated action.

But it is upon the figure of Peter that the great painter expends all the resources of his genius. It is a grand figure, with flowing drapery. In an attitude of command, with head somewhat inclined forward, and as Leigh Hunt writes of the Angel of Death,—

> "A face, not of this earth, half veiled in gloom
> And radiance, but with eyes like lamps of doom;
> Which ever, as he came, before him sent
> Rebuke, and terror, and astonishment."

That figure tells grandly the whole moral of the story. The punishment was not for avarice, or deceit, or lying, but for hypocrisy. Not revenge, but judgment. Not for crime against man, but sin against God. And as we look upon it, we can imagine we hear those dreadful words pronounced just before Ananias "fell down and gave up the ghost." "Was not the land thine own, and after it was sold, was it not in thine own power? Thou hast not lied unto men, but unto God!" Among all the works of the great Raffaelle, there is not one more wonderful than this for its blending of natural truth with the sublime and terrible, and the force with which it tells the tale it is meant to convey.

Turning from Raffaelle, we find, still among the sons of Italy, another of the greatest painters of all time, Michael Angelo. In some measure he is the rival of Raffaelle; but to the latter is generally accorded the palm of superiority. But the versatile genius of Michael Angelo ran through the whole circle of art, and gave him as great a mastery over the marble as over the canvas. It would be hard to say in which department he was the greater.

The picture of Michael Angelo's to which we wish to call attention, is

THE LAST JUDGMENT,

Painted upon the walls of the Sistine Chapel, under the direction of popes Julius the Second, and Clement the Seventh. This is undoubtedly the most wonderful work ever created by any painter. The number of figures, all carefully finished, is about two hundred. In the centre is the Messiah, with the Virgin Mary by his side; grouped around are apostles, prophets, patriarchs, saints, and martyrs; above are angels bearing the cross, the crown of thorns, and other emblems of the passion of Christ; below, other angels support the Book of Life, and call forth the tones of the trumpets, at the sound of which the dead wake to life. On one side, the faithful are ascending; on the other, demons are dragging the condemned down to everlasting torment. Considered as an effort of skill, this picture is wonderful. The labour it represents is immense. It occupied the best part of nine years, and the painting is perfect; yet the effect upon the mind is unpleasant, or rather painful. While it satisfies the sense, it outrages the sentiments. It is intensely human, not spiritualised. The Saviour is an athletic figure, with a face upon which is painted the vindictive rage of man, not the sad justice of an offended God. The gestures express the same feeling. Wonder and horror are the elements of the composition, particularly in those parts which represent the condemned. Their terror, anguish, and frantic struggles, are fearful. Kugler has written of it, that we do not see "the glory of heaven—for beings bearing the stamp of divine holiness and renunciation of human weakness; everywhere we meet with the expression of human passion, human efforts; we see no show of solemn tranquil forms—no harmonious unity of clear grand lines, produced by ideal draperies; but in their stead, a confused crowd of naked bodies in violent attitudes, unaccompanied by any of the characteristics made sacred by divine tradition." Notwithstanding this criticism, all rank this great picture among the greatest wonders of the world, and if Raffaelle may be called the Shakspere, Michael Angelo is the Milton of painters.

A name less known to the mass of people, but still in the same rank, is that of Sebastian del Piombo, a Venetian, what painted the colossal picture of

THE RAISING OF LAZARUS,

In our National Gallery. This picture was produced to rival Raffaelle's celebrated picture of the Transfiguration, and Michael Angelo, who was jealous of Raffaelle's fame, assisted to ensure its perfection. Though the greatest merit is generally awarded to the Transfiguration, the opinions of connoisseurs are yet divided as to which of the two is entitled to be considered the foremost picture in the world. The time chosen by the artist is apparently a few minutes after the miracle has been accomplished—Lazarus has arisen from the tomb, and eager hands are assisting to disentangle him from the grave-clothes by which he is still encumbered. Sebastian is known to have been proficient in his power of drawing the naked figure, and this Lazarus is a splendid specimen of anatomical drawing. The play of the muscles, and the force and precision with which they are displayed, are wonderful. The expression, too, is as perfect as the details. There is the wandering eye and the uncertain action, which indicate consciousness escaping from oblivion. The senses which had been steeped in so profound a lethargy, are struggling forth as the first ray of morning peeps through a misty twilight. The man is evidently awaking slowly and with difficulty from that deep sleep of death into which he had entered. The figure of the Saviour evinces that difficulty which the greatest masters have experienced—that of blending the sublime and tenderer attributes of the Messiah — Michael Angelo, we have just seen, depicted him as merely terrible,—here we have the other extreme. There is a want of that divine dignity which we associate with the character; but there is a beautiful expression of tenderness and patience, and a touching appearance of that kind of pensiveness, which in a lesser degree appears in the portraits of the unfortunate, and which the speculative assume to be able to trace in the faces of those doomed to an untimely death. The most beautiful figure in the whole picture is that of Mary, who bends at the feet of Christ, and whose attitude, face, and manner, all evince the deepest gratitude, and the most perfect devotion. We can only afford space to notice three other figures, as among the highest examples of perfection in painting. That of St. Peter, who kneels in a rapture of adoration, and those of St. John and the unconvinced Jew. St. John is turning to the Israelites with a beaming expression of confidence, evidently appealing to the miracle as proof of the truth of Christ's mission; and we are tempted to wait for the doubt on the face of the latter vanishing under the influence of conviction. There are some faults of colouring, light and shade, and perspective, but altogether it is a great picture, and it will be long ere any modern hand approaches to the excellence it exhibits.

The fifteenth century was productive of great painters. In that period was born *Leonardo da Vinci*, *another contemporary* and rival of Michael Angelo. Like his contemporary also, his genius was of the universal order. "There were giants in those days." He was handsome and possessed of great physical strength, and he excelled as a painter, a sculptor, an engineer, *a mechanic, a poet, and a musician.* He was one of the cleverest and most careful painters of his age, applying the great chemical knowledge he possessed to the elaboration of his colours and varnishes, and finishing everything with a care due to works which are to be bequeathed to posterity. To such an excess did he carry this, that Pope Leo the Tenth, said of him, "This man never finishes anything, because he thinks of the end of his work before it is begun." His works are consequently scarce, but of the highest order. Two of the best are, Christ disputing with the Doctors, and that which we have chosen,

THE LAST SUPPER.

In this large and fine composition, the Messiah and his disciples are represented sitting at a long board, on which are spread articles of food. The Saviour has just foretold his betrayal by one of the twelve. The faces of the disciples—all except one, that of Judas, which has a malignant side-long leer—express dismay and curiosity, and they are disputing and eagerly inquiring among themselves which of them is the *traitor. The figure of Christ is in grand contrast to all the* others. It exhibits a noble dignity and a calm repose, befitting his high character and the solemnity of the occasion. The opinion pronounced by the great painter, Rubens, upon this picture, will better express its worth than any criticism of our own. "The best example of his genius, which Leonardo has left us, is the Last Supper. In this picture he has represented the apostles in places suitable to them; but our Saviour is in the midst of all, in the most honourable place, with no figure near enough to press or incommode him. His attitude is grave, with the arms in a loose and free posture, to show the greater grandeur; while the apostles appear agitated by the vehement desire to know which among them is he who will betray his master; in which agitation however no mean or indecent action can be observed. In short, by profound thought, Leonardo had arrived to such a degree of perfection, that it seems impossible to speak as highly of him as he deserves, and much more impossible to imitate him."

The greatness and interest of the subject might well call up all the powers of an enthusiast, and a thorough self-devoted, self-subordinating enthusiast, Leonardo was, as is shown by the manner in which his own spirit trembled before the greatness of the work he attempted.. In the painting of this work, Leonardo commenced with the Apostles, bestowing upon each, in its turn, all the art he had acquired, but the head of the Messiah he never finished. That same difficulty, which we have already alluded to, of combining in one face the various attributes required, which had driven Michael Angelo to one extreme, and Sebastian del Piombo to another, beset him. He had formed so high a conception of the beauty and power of features and expression which should be given to the face, that he distrusted his own power to do it justice, and when he died the head was only a sketch. Like most men of deep and fervid feeling, however, Leonardo was quickly roused to bitterness, and sometimes expressed it in his own fashion, with biting satirical power. Another anecdote of this picture will illustrate this. The head of Judas was, for some time, left incomplete, the artist desiring to throw into the face an amount of malignity he almost despaired of representing. The prior of the Dominican Convent, for which the picture was being painted, was a cold, harsh, ascetic man, with little sympathy for the artist. He was displeased at the delay, and complained to the duke. The duke spoke somewhat sharply to the artist upon the subject, and the head of Judas was forthwith finished. It may be doubted, however, that the prior was satisfied; for the painter produced the portrait of that ecclesiastic to stand for Judas, and thus handed him down to posterity as the arch traitor.

Milan fell under the French arms during the reign of Louis the Twelfth, and again when Napoleon commanded the army of Italy; but, in both cases, the conquerors respected this great picture. Louis treated the artist with the greatest respect; and when Napoleon entered the hall, which contains the painting, he was so penetrated with admiration, that he wrote an order on his knee, forbidding the military to be lodged in the place. The refectory, after Buonaparte left, was, however, employed as a granary and stable; but Eugene Beauharnois, when he became Viceroy of Italy, had it cleaned out, and built a platform to enable spectators to gain a better view of the picture.

Another kind of painter, and another style of picture, but still in that wondrous fifteenth century, when the Italian mind made such great efforts, Antonio Allegri, surnamed

Corregio, from the place of his birth, born in 1494, died in 1534. Forty years, a short life that for greatness. Of Corregio himself little is known. He has left no personal mark of his own individuality upon the world, except in his pictures. They tell us that he was a man of a soft, mild, sympathetic, affectionate nature. Not so elevated as Raffaelle, nor so strong and mighty as Michael Angelo. Probably a meek-eyed quiet man, mingling but little with the world, and living for posterity, without thinking much about posterity. How we read men's characters in their works. Hear what a biographer says of this Corregio. "The expression which Corregio infuses into the lovely creatures of his pencil, is in harmony with the grace of his drawing, the pure sweet colouring, and the concordant tone of the picture. Avoiding harsh and unpleasant subjects, and delighting in the play of tender emotions, his mothers fondle their offspring—his children frolic and smile, with all the ecstasy of unreproved nature. Annibale Carracci bursts out with a desire to join his infants in their sports, so real and living does he find them. If his beings are of a less mighty mould than Michael Angelo's, his colouring less powerful in its tints than Titian's, and his design less perfect and exalted than Raffaelle's, no artist has equalled him in gentleness and sweetness, and none calls forth the affections of the spectator in a more lively manner." That is the truth, Corregio is the painter of the affections, and how splendid and valuable his pictures are, may be judged from the fact, that the one of which we are about to speak—

THE ECCE HOMO,

And another (the Education of Cupid) were bought of the Marquis of Londonderry, for our National Gallery, for the sum of £11,500. The Ecce Homo is a comparatively small picture, and contains only five figures. It represents the moment when the Saviour having been examined, Pontius Pilate, giving way to the clamours of the mob, brought him forth, saying, "Behold, I bring him forth to ye, that ye may know I find no fault in him. Then came Jesus forth, wearing the crown of thorns, and the purple robe. And Pilate saith unto them, 'Behold the Man.'"

There were evidently two ways of treating this, which is among the grandest and most affecting scenes in the history of the world. One would have been to represent the Saviour firm and undaunted among the excited crowd, crying, "Away with him! away with him!" "Crucify him! crucify him!" That would have been Michael Angelo's treatment. But Corregio, with a fine perception of his own powers, adopted another course. He has shut out the crowd, and concentrated attention upon the principal personages in the Divine life drama. In the centre is the Messiah—the crown of thorns eating into his brow—the cords cutting into his wrists—the purple robe thrown loosely on his shoulders. There is nothing stern—nothing grand—nothing even highly intellectual in the face. But, oh! the expression of calm, sorrowful, forgiving endurance that looks out of those deep eyes, and sits like a beautiful cloud on the wan face and delicate features, goes to the heart. It is the divinity of the emotions and tenderer feelings of humanity. Intensely human, but human in those depths of feeling, where the man almost touches the God. Looking at it, we forget our ideas of the majesty and dignity of the God-man, who is to judge the world, and going back in thought to the word of the prophet Isaiah, see him, "who bore our sorrows," and, "like a sheep before his shearers, was dumb." We gaze upon a sacrifice made ready, not on a triumph.

One of the wonders of this beautiful picture is, that although there is nothing gaudy or meretricious in the colouring, no grand masses of light and shade, no startling effects, few pass it without lingering before it. There is a quiet subdued magic about it, which first gently draws, then rivets the soul. For some moments attention is fixed to that face we have so faintly attempted to describe, then the eye begins to take in the accessories. On one side is the Virgin Mother, not the saintly Madonna of other painters, but a human mother, a woman standing for the last time before her doomed child. She is sinking under the anguish of the severance of that bond of love, the force of which none but mothers know. Attending on her is a woman not beautiful, but radiant with human sympathy. On the other side is a bronzed stalwart Roman soldier. The stern man, you see it in his solid features, feels the pathos of the scene. His look, too, seems to say that he is almost converted by the holy patience of the victim. In the background is Pilate, cold and calm—voluptuous and self-satisfied. The image of the man who justified himself, because he *only* permitted wrong, who excused himself by washing his hands of the injustice he suffered to be done. Never, perhaps, out of so few materials was such powerful effect produced; and we quite concur in the opinion which has been expressed, that though in our national collection there are grander pictures, this is "*the gem of the gallery.*"

We have already mentioned Titian, "The Wizard of Colour." He is the great master of what is called, the Venetian school. Not so correct in its drawings as those of Rome, or Florence, it produces effects by skilful disposition, contrast and depth of tints. One of the great pictures upon which Titian's fame rests, is that of

BACCHUS AND ARIADNE,

A gorgeous, rich, mellow composition. The subject is a Bacchanalian one, and the spirit with which it is expressed would almost tempt a water-drinker. There is the squat Silenus, over full of the juice of the grape; the lively Ariadne, so full of energy and excitement, and a group of nymphs, fauns, and satyrs, in the abandonment of reckless jollity. One little faun in particular, dancing with a calf's head dangling at his heels, is the vital embodiment of various excitement. We once heard an old toper say, that it is a picture to make the man who looks at it tipsy. The distribution of the colours and their general effect is absolutely gorgeous. The centre is all in a glow with the rich flesh tints, the vivid drapery, and the bright flower wreaths, aided by the bright car in which the fabled deity sits, and the spotted leopards which draw it. While the deep blue of the sky meeting the horizon, the glimpse of the calm sun and the refreshing green of the trees, relieve and throw forward the main portions. Worthier subjects there are, such as we have before noticed. Other works are more suggestive and intellectual, but for colour, striking, without paining the eye and delighting the senses, few pictures can compare with this one.

Leaving the Italian school of art, we turn for the sake of contrast, to some of the works of Rembrandt, which, though equally famous, are esteemed for different considerations. They are superior to the Roman school in design and accuracy, and to the Venetian in colour; but their great charm consists in their mastery of light and shade, and of all the neutral tints which float between the two.

Rembrandt was the son of a miller; the date of his birth 1606; the place his father's mill, on the banks of the Rhine, near Leyden. His hints of the force of light and shade, are said to have been drawn from the bright beams streaming in from an aperture in the wall to the dark apartments below. So trifling are the causes upon which often greatness depends.

Rembrandt despised the Italian schools, with their talk about *grace, sublimity, and beauty, which he did not affect to comprehend.* He disregarded the antique, and laid hold with a firm grasp of the realities he saw around him. At different periods of his life he had two styles,—the first remarkable for finish, the second for effect. In the latter the colours were laid on as though with a trowel; and when some one remarked this to him, he retorted, that he was "a painter, not a dyer." One of the best specimens of his finished style is in the National Gallery, and represents

THE WOMAN TAKEN IN ADULTERY.

It is a small but exquisite picture. The beauty does not so much reside in the figures. The figure of the Saviour wants both grace and majesty, and the woman grovelling in self-debasement, is far from attractive; but the grand masses of light and shade, bringing forward or deadening the groups, the rich glow of the drapery of the accusing priest, in contrast with the simple garb of the Redeemer—the shadows flitting on the wall, and column, and sculptured figure, and the rays falling aslant on the gilding and fretwork, make up an *ensemble* in which the mind buries itself, and call up memories of that gorgeous temple in which was enshrined the Ark of the Covenant, of that sumptuous veil which was rent asunder when the Spirit departed from a stiff-necked people, and of that land of wonders, and age of miracles, such as will never more be witnessed on earth.

Another painter of the Flemish school is Rubens, but differing greatly from the preceding. The essential aim of Rubens is splendour; the means by which he accomplishes it, generally vividness of colour. His women are of the "fat, fair, and forty" class; and a witty writer says, that his children are like "hillocks of roses;" but this is atoned for by clearness of design and lucidity of detail. Stand before some of his large pictures, shut your eyes till the mingling lashes render it impossible to discern form, and you see a Dutch flower-bed with rainbow hues; open them wide, and life, real flesh and blood life, bursts upon you, and gems glitter, satins glisten, and flowers bloom. Rubens sought effect, and would have it even at the expense of truth. One of the pictures most free from these blemishes is, the allegory of

PEACE AND WAR,

painted by Rubens when he was envoy from Flanders to this country, and presented by him to Charles the First. The subject is treated with marvellous power, and vividly embodies the best arguments against physical strife. Peace is represented as a mother giving "Nature's food" to a rosy child. A nymph, representing Affluence, presents her with a coffer of gold and gems; a satyr, typical of rural pursuits, empties at her feet a cornucopia of luscious fruit; and a panther, indicative of fierceness, tamed down by the spirit of gentleness, plays with the falling tendrils of the vine. A group of small children, attended by the deities of Love and Marriage, symbolize domestic joy;—Mars, with the demons of War, advances from the background, but is repulsed by the true guardian of Peace—Minerva, the goddess of wisdom. There is a curious mingling in this picture of the mythological, the emblematical, and the domestic, but the whole forms a splendid work of art.

The finest picture of Rubens, however, is in the Antwerp Cathedral,

THE DESCENT FROM THE CROSS.

The effect of this composition is truly astonishing. It inspires a sentiment which is produced by few other pictures. It is attractive, but solemn and awe-inspiring, as befits an altarpiece. The effect is produced by the grand grouping, the deep colour, as the masses of light and shade which give the character to the whole. The dead Christ is being lowered from the cross. The wound in the side, the nail marks upon the hands and feet, are still fresh. The stiffness of death has not come over those glorious limbs. The head droops; the body yields to one side, the arms hang flaccid and powerless, and the ghastly livid tint of death is over all. Not a repulsive one either, but one that Melancholy might choose for her own. On this figure falls the full light, concentrating upon it at first all the attention. The eye sees nothing else for a time. There the interest is concentrated with a power which forbids it to wonder; and it is not till after the sight is filled with That, that it looks to the groups. Still they are admirable too. rhe hands which are holding the body, do not treat it as tudely as that of an ordinary malefactor; they seem as though they had caught something of tenderness fiom the mortal shroud, which so shortly before enveloped the Immortal; and the grieving disciples at the foot of that cross on which they deemed their hopes crucified, make up a whole, scarcely to be paralleled for solemn awful grandeur and beauty.

We take one more example from the Italian Masters. The pictures we have already noticed of them, belong to the historical, this to the mythological and allegorical section. It is

THE AURORA,

painted by Guido in his happiest moments, upon the ceilings at the Palazzo Rospigliosi, at Rome. The great attractions of this work are, its beauty of manner and poetic conception. It represents Apollo in the chariot of the sun beginning the day, attended by nymphs personifying the Hours, and preceded by Aurora strewing flowers in the sun's path. Rogers sings of this painting—

> "Oh, mark! again the coursers of the sun,
> At Guido's call, their round of glory run!
> Again, the rosy Hours resume their flight,
> Obscured and lost in floods of golden light."

The *bounding coursers with tossing manes, are stretching* out on their long journey round the earth, seeming to spurn the clouds on which they tread. Apollo, her lover, flying with the rapidity of their motion, urges them on to yet greater speed. The Hours, rosy, laughing, buoyant, trip around with gesture free and step so light, that the clouds may well seem to bear their lovely burden. Aurora flies before, strewing those children of the sun-flowers as lightly as a summer breeze, and as gracefully as the willow bough which waves in it. The whole of this enchanting group is bathed in a flood of mellow golden light—the true beams of morn—and far below, the earth is just waking up from its shady slumber, and the sea throwing from her bosom the shadows which during the night have reposed there. It is a picture which rouses the senses to look upon, and makes one feel as lightsome as a sunbeam and as buoyant as the motes which dance in its warmth.

As a last example, we turn to a very different class of pictures, those of the true Flemish school. They do not deal with high themes or lofty imaginings. They are not noted for brilliancy of colour, or conspicuous for correctness of drawing. They represent coarse natures, and often gross enjoyments, but they are full of spirit; true to nature, and so highly finished, that they will bear being viewed through a magnifying-glass. Adrian Von Ostade was born at Lubeck, in 1610, and his picture of

"THE SMOKER"

Is now in the *Musée Francais.* The picture contains only four figures. Two boors playing at cards—the one, whose face is seen, is about to play a card, and his countenance is wonderfully expressive of consideration and cunning. The back of the other, as he leans forward, tells us plainly of anxious expectation, as though we were looking into his eyes. Looking over them lazily is a female, who seems to take a sort of languid interest in the game. In front is the figure of "The Smoker." He has sat himself down on the rude wooden bench, and crossed his knees, in the full enjoyment of luxurious *abandon* to his favourite pursuit. In one hand is the pipe, in the other the tobacco-box; but his attention has, for the moment, been called by something, and with slouched hat pushed carelessly on one side, he looks round, half curious, half impatient, at the momentary delay interposed between himself and his pleasure; before him is a rude three-legged table, bearing a jug and the pipe left by some other smoker. This group is collected in a low crowded room, through the latticed window of which the light struggles in with difficulty. The first thing that strikes the observer is the truth, homely though it be, of the whole. Those heavy boors absorbed in their play—that curious woman—this indifferent smoker, are all so life-like, that we nearly expect to see them move and hear them talk. The next impression is that of minute painstaking. That pipe you might put out your hand to take up. That jug is round, and the dim light does glance and glimmer on its polished surface, and the glass in the window is real in its actuality and transparency. The works of Ostade are scarce. He bestowed too much labour upon his pictures to be a prolific painter; and that, added to their merit, gives them a high value.

Diverse in their mental structures and their efforts as the men are whose works we have noticed, they are all bound together by one golden cord. Raffaelle, sublime and etherealized; Michael Angelo, stern and majestic; Sebastian del Piombo, grand yet tender; Leonardo da Vinci, dignified and venerative; Titian, master of colour; Rembrandt, solemn and awe inspiring; Corregio, softly expressive; Rubens, gorgeous; Guido, poetic and fanciful; and Ostade, faithful and homely; are all examples of that inspiration of genius, which may be improved by industry, but can never be acquired by labour. Before the possessors of it, men bow reverentially feeling that it is God-given.

THE NILE.

There can be but few persons who have not heard of the Nile. The facilities of modern travel, the longing of antiquaries to dive among the remains upon its banks, and the curiosity of the educated, have caused every cranny and nook of the valley through which it runs, and the Delta it forms before entering the sea, to be explored. There is no river in the world to which so much interest attaches. It is identified with the existence of Egypt, as Egypt is with the dawn of science upon the world. How far old Nile stretches back into time beyond the period compassed by human traditions always the saviour of Egypt from the desert? No wonder that it was in the days of Paganism the sacred river; no wonder that it was worshipped as a deity, for it was ever preserving a country from destruction. In that place there are two great antagonist powers, the sand and the river. Year by year the sands sweeping across the barren plains bring with them clouds of that dust which overwhelmed Nineveh and buried its palaces. Year by year the fields and gardens of the fellahs are invaded by the destroyer of fertility; and year by year too old Nile rises and beats back the destroyer; flowing all around to the desert edge, and leaving a deposit so fertile that the rudest cultivation is sufficient to produce abundance.

How long has this been going on? Chronologists cannot tell us, nor historians furnish the answer. That long line of Egyptian kings, which the hieroglyphists seem to have dragged from the obscurity of the past, stretch out far beyond the date usually assigned to Creation. If not fabulous, they add another era to the history of the world. Among them "the eternal Nile" constantly appears, preserving kings and subjects alike from destruction; "the sacred river" came down thousands of years, but still keeps in the remotest mists of dim antiquity. Pyramids rise and thousands of labourers toil at the gigantic works, people of many races and various creeds toiling hard under cruel taskmasters. There let imagination picture the Copt, the Arab, the Ethiop, and the Jew. The chosen people in that degradation which preceded the beginning of their greatness; before the lawgiver came to lead them forth from the land of bondage, they toiled by the side of the fertilizing Nile. The Jews departed, became great, fell, rose again, only to fall a second time, and become the wanderers they are among the nations of the earth, and still the Nile fertilizes.

Greece rose to give a race full to overflowing of beautiful thoughts to the world. Greece struggled through the infancy of science, and looked to Egypt for deeper learning. Her philosophers made their pilgrimages to the islands of the Nile, and from the purity of the stream learnt secrets till then beyond their comprehension. Greek arms conquered the world. Greek science laid the foundation of European civilization. Greece fell into the deepest degradation; but still the Nile flows on, rising and falling, fighting the sand, as it did before Greece was known.

The Romans came, the conquerors of the world, and Egypt trembled at the tread of their invincible legions. But science had by this time fled and degenerated into a juggle. They found magic instead of learning, and a Cleopatra instead of the ascetic priests of an old faith; but still before them flowed, as it had flowed of old, the ever-fertilizing Nile. In her turn Rome fell, and new empires arose; the Nile kept on its ceaseless way. The cross supplanted the emblems of a grosser faith; the Saracen came with his soldier creed; the Crusaders set their mailed foot upon the arid soil; the Turks dominated in their turn; a subtle Greek wrested from the decaying power of the Porte the rule of Egypt. For all and among all, the Nile rose and fell; and to-day, when Egypt is becoming the great highway to the East, and civilization seems slowly, like a strong swimmer against a heavy tide, struggling back to her Oriental birthplace—the Nile is there performing his world old mission of assuring to the dwellers upon his banks the bread of life.

What a history for a river. There is no other stream can show so eventful a record, no one so closely intertwined with the progress of the human race. What a spectacle it would be if we could collect upon its margin, one from each of the races it has witnessed in its course—one of the monuments of each of its eras. There would be the black rattling his chains, the Bedouin brandishing his spear, the fellah with the implements of agriculture, the toil-worn Israelite, the priest with many a mystic symbol, the graceful supple Greek, the sturdy Roman with his martial air, the mailed Crusader, the turbaned Moslem, the Frankish warrior, and the English merchant. Some are gone for ever; some are changed till they have lost their original features; the highest have fallen, the lowest risen up, but still, unchanged, the Nile spreads itself around in life-giving streams, or contracts itself within its narrow bed. A great poet has told us that the Pyramids shall fall, and Nile continue to pursue his changeless way But it is remarkable, as one of the strange freaks which time plays with men and things, that while the great have vanished, the small and the unnoticed remain. A recent traveller tells us, that the villagers of Egypt, the peasantry, are, of all people in the world, those who have changed the least. What they were when they tilled the land in the days of the Shepherd kings; what they were when they toiled at the Pyramids, or laboured at the quarries, from which the vast monumental stones were dug, that they are now. The same poverty, the same fashion of garments, the same tame submission to tyranny, the same massive kind of beauty in repose about their faces as that which characterizes the colossal sphinx. The Nile, the hovels, and the poor abide, while kings, monuments, palaces, and temples perish, and faiths are changed and forgotten.

Leaving, however, the history of the Nile, and the associations which are inseparably entwined with it, when we come to the river itself it does not appear so remarkable as it did to the ancients. It was the largest river they knew, not indeed for its breadth, which is inconsiderable, but for its length of about 2000 miles. In both length and breadth however it sinks into insignificance when compared with the rivers of the New World. The Plata, the Amazon, and the Mississippi are all much larger; and the valley of the latter river far exceeds the valley of the Nile in size, while it equals it in fertility. To the ancients the Nile was also remarkable as being the only river within their knowledge which periodically overflowed its banks; but it is now known that all rivers within a certain distance of the equator do so, and the cause of the inundation, which was attributed by pagans to the influence of the deities, is now recognised in the long rainy seasons which make the winter of tropical countries. The Nile is not noticeable either for the number of its tributaries, for from the confluence of its eastern branch to the Delta, a distance of about 1350 miles, it does not receive the waters of a single tributary stream.

There was a tradition in olden days that a mystery hung over the sources of the Nile, which it was not possible to penetrate. In some degree this uncertainty still remains, as the springs of its main branch have never been discovered. All that appears certain is, that it rises somewhere in the mountains of Africa, just to the north of the Equator; but attention has been strongly directed to this point, and at the moment we write, more than one adventurous traveller is making his dangerous way to the mystic fountains, so that it is probable all doubts will be soon expelled. The Nile has three branches, known as the Bahr el Abiad, or White River, on the west; the Bahr el Azreek, or the Blue River, the central branch; and the *Tocazze*, or *Albara*, the eastern branch. Of these, the latter is the least important. These three branches were known to Ptolemy, and the writers who followed him; but their notions about them are somewhat confused, when viewed by the light of modern discoveries. In one point, however, they were undoubtedly right. Contrary to an opinion generally received until very recently, they regarded the White River as the true stream of the Nile, Bruce and other travellers being in favour of the Blue River; and as the sources of that have been ascertained, we will first glance at its course.

THE BLUE NILE.

According to Bruce, whose discoveries were probably preceded in point of time by Father Paez, and perhaps other missionaries, the Blue Nile has its rise at several points of the mountains lying in the eleventh degree of north latitude and thirty-seventh degree of east longitude. This locality is inhabited by a savage and pagan tribe, called the Agaias, who, like the ancient Egyptians, worship the river. After running about sixty miles to the north-west, the Azreeh enters a vast lake sixty-five miles long, and more than thirty broad. This lake, which is called Dambea, or Tzona, is on a table-land surrounded by hills and mountains, from which many streams flow into it. Leaving the lake at its south-east extremity, the Blue River runs to the south-east, and forms an extensive cascade at Atala, and then turns to the south and south-west, through the provinces of Gojam and Damœt. Taking a north-west course, it twice intersects the tenth degree of latitude, within four hundred miles of the known course of the White River.

The tract of land between these two branches has never yet been explored, and seems to present, for the time, insuperable difficulties. So far as is known, it is inhabited by savage tribes of natives, under the names of the Dendu, the Shilluks, and the Bokki. It then flows to the north-west, through many barbarous states, including Senaar and Nubia, to Kharhun, where it joins the White River. "The Nile, below the point of junction of the Abiad and Azreek, presents a truly magnificent spectacle. Between Halfay and Shendy, the river is straightened, and traverses a deep and gloomy defile, formed by high rocky hills, between which the Nile runs dark, deep, and rapidly, for twelve or fifteen miles. On emerging from the defile, the river again spreads itself majestically, and flows between immense plains of herbage, bounded only by the horizon." About thirty miles above Nacesreddin, the head village of Berber, the Tocazze joins, and there the Nile is more than two miles broad from bank to bank.

The difficulties which Bruce the traveller must have encountered, and which still oppose the discoveries of Europeans, may be estimated from a short account of the expedition of Ismael Pacha, a deceased son of Mehemet Ali. Ismael, accompanied by 1500 men, proceeded along the course of the Blue River, above Khartûm, in search of the gold mines of Quâmâmye. On the eighteenth day, in latitude *10 degrees 50 minutes north, they found gold in the sand*, but in such small quantities as not to be worth the labour of washing. This, however, was in the dry season; and a negro chief said, that, after the rains, pieces of gold were found of the size of a bean. After staying seventeen days among these sands, and convincing himself of their barrenness, Ismael penetrated two days' march nearer the equator, but here the warlike tribes of blacks so stoutly opposed his passage, that finding himself in danger, he was obliged to beat a hasty retreat, and make the best of his way back to Egypt.

THE TOCAZZE

Rises in the high mountains of Losta, in latitude 11 degrees 40 minutes north. It flows through a barbarous country for some four hundred miles, and finally falls into the Nile in 17 degrees 45 minutes north latitude. The sources of this river were first known to the indefatigable Jesuits, as was the case with those of the Blue River; afterwards, to Poncet and Bruce, and Pearce. Salt, in his account of it, says, that he saw in it tremendous crocodiles of a greenish colour, and immense hippopotami.

THE WHITE NILE,

Is that branch which still remains enveloped in mystery. Expeditions have been fitted out, and lives have been sacrificed, in order to complete our geographical knowledge; but the mystery which the Egyptian priests taught was impenetrable still hangs over it. A body of soldiers of the Viceroy of Egypt's army, headed by Ibrahim Hushef, made a thirty-five days' journey along its course above Khartûm, where the Blue River joins; but they did not approach near any point where it was possible that it could take its rise, and were at length obliged to return from the same causes as prevented the progress of Ismael Pasha and his party. They however traced it distinctly toward the ranges of mountains in which the Blue River takes its rise, and that no doubt is the direction in which further inquiry is to be prosecuted. This party remarked a striking difference between the White Nile and other rivers. Where the confluence of the Blue and the White takes place, the latter is not more than six hundred yards broad, but it widens as it approaches its source. At one of the points which the Egyptian expedition reached, it is said to be "six hours" in width—that is, about twenty miles. From this it is inferred that the White, like the Blue Nile, passes through a large lake somewhere near its source; and this opinion is confirmed by the fact, that at the periods of the inundation large quantities of fish are brought down by the force of the stream.

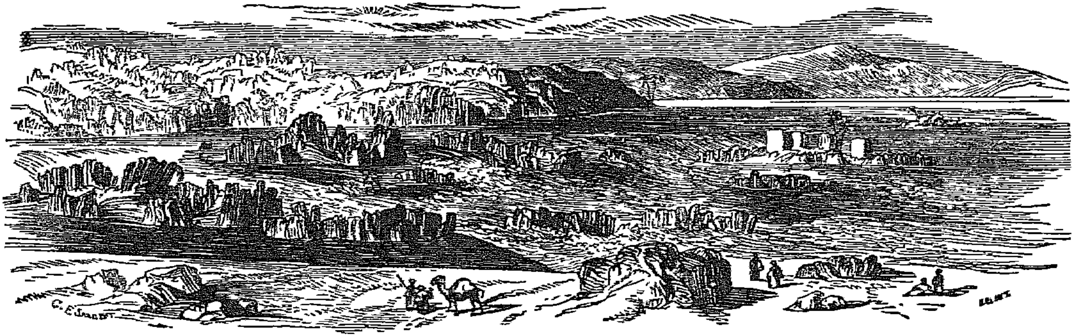
The terms of White and Blue Nile are not, as is often the case with proper names, merely arbitrary terms. The word Nile or Nil, applied to the main stream of the Nile after the confluence of its various branches, is an old indigenous appellation, meaning river; and the streams have local names in the places through which they pass, as—Adit, in Sennar, and Abawi, in Abyssinia. The words, White and Blue, are descriptive of the colour of the waters, which play distinctive parts in the fertilization of Egypt. The Blue River, and the Tocazzo, have their waters coloured by alluvial deposits which they carry down; but the stream of the White Nile is mixed with a kind of white clay, and when disturbed is of a soapy or creamy consistency. It is the mixture of these which produces the mud of the Nile.

We have now brought together, in a connected form, most of what is known of the Nile as it flows through the savage regions of the interior of Africa, and proceed to mark its entrance into Egypt, and its passage through the valley of the Nile.

When the Nile leaves Nubia, it flows in a deep and narrow valley among numerous islands, and forms

THE CATARACTS.

These begin at the sacred islands of Philoe and Elephantina—the second being the most violent; and the third at Syene, or Assouan, leads the Nile over a bed of granite into Upper Egypt. The country of the Cataracts presents the most striking of all Egyptian scenery. A recent traveller, describing it, says, "As we continued to advance, the scenery grew more wild and awful. It was like a ruin of Nature herself, as if the earth had been shaken to her very centre, and rocks and mountains had been hurled from their foundations by the violence of her convulsive throes. In the hollow of caverns, formed by these grotesque combinations, flocks and families had taken up their residence, and secured to themselves dwellings, which nothing but a similar revolution could destroy." At another part, "Towering mountains were formed on each side the river, of immense masses of black granite, heaped on each other, and hanging in an endless variety of forms; while their broad shadows cast upon the surface of the stream a fine dark gloom, quite in keeping with the scene. In the centre of the Nile were again seen smaller combinations of rocks, which formed innumerable islets, over some of which the water partially flowed, while their sharp points, cutting the current in its course, created foaming breakers in miniature, the murmurs of which were the only sounds that disturbed the stillness of the calm. In some of the hollows, worn out by the annual friction of the rising inundation and whirlpools, when the Nile was at its height, a bed of rich alluvial had been deposited, from which had sprung up young trees, plants, and bushes, the isolated verdure of which derived a higher beauty from contrast, and seemed like little Edens encompassed by a wilderness. The very rocks themselves, too, exhibited all the varieties of form and colour possible to be conceived; while their adamantine surfaces exposed to the constant stream, were worn to a smoothness of polish which art could scarcely give to them; and by the infinite variety of their positions, reflected back the rays of an unclouded sun from every point, like dark steel mirrors. If one only of these masses of granite rocks had been made to rise in any other situation, it would be impossible to persuade one's-self that they were not covered with some transparent varnish. Here were huge mountains of basalt, and black and rose-coloured granite, the latter crossed with veins of the finest porphyry, and smaller lines of brilliant quartz, changing at every step their hue of shade



THE CATARACTS OF THE NILE.

and quality of grain; while the awful depth of this dark and silent valley gave to the unclouded sky a brighter blue, and produced altogether a splendid picture of Nature in her wildest dress. Not a single outlet for the stream is visible in any one direction from its centre; the curves of the river's banks shutting the opposite points, and giving it the appearance of an encircled lake, rendering the spectator, to use a sea phrase, completely land-locked, while the magnificent monuments and temples of Philoe, seen from hence, give an increased magnificence to the scene."

THE SACRED ISLE.

Ah! those old priests of Egypt worshipped beauty, and had a fine eye for effect. They made the power of their sensual religion greater by sensuous aids. In this great natural temple, they erected their artificial ones, and in the recesses of this land-locked valley buried themselves in the deepest mysteries, and practised the most secret rites of their faith. No wonder that with such a priesthood, and with such aids, that faith, dark as it was, attracted the ambitious, urged on the enthusiastic, and held enchained the ignorant multitude for ages. What the lovely isle of Philoe was when in the zenith of its glory and the height of its splendour, we can hardly imagine, for now, when it is ruined and deserted, men who land upon it—not ignorant men, but those whose minds are acquainted with European art—almost lose their senses in the intoxication of delight and wonder, in reverent reveries, as though through a charmed land. Mr. Buckingham so vividly describes both the scene and his sensations, that we take from his book the passage relating to it. He says—

"We had been coasting along a shore as barren as the minds of those who people it—between mountains whose aspect was as wild and sterile as the inhabitants were destitute and savage, and stunned with the harsh voices of their discordant boat-songs, which the rocks re-echoed from their solitary caves, when in a moment, as if by fairy transportation, on turning the sharp angle of the eastern point, Philoe was before us! I had heard the crew exclaim, *Shellall! Shellall!* 'The cataracts! the cataracts!' and when I rose to join in the congratulation of our arrival, the song was ceased, the rowers being on their suspended oars, and we glided down the rapid stream without a sound—without a murmur, even of its wave—to break the stillness that reigned. The silent calm, the momentary contrast, the zenith moon, the midnight hour, and the surrounding scenery, amid which this enchanting island seems enveloped, all gave a charm to the picture which no pencil could portray—which must be witnessed and felt, to be at all conceived. The boat moved near the shore; the night waned, the day advanced, the sun rose, and when his early beams first gilded the broken columns, obelisks, and roofs of Philoe, the pomp of ruin was complete; it was, like the hoary figure of bearded age, more venerable in decay; and, notwithstanding the reflective reasoning of the preceding hour, I could not but admit, that a people who were capable of works like these, must have been great, must have been wise—I had almost said, must have been virtuous also—since it is impossible to look, even now, upon their edifices, without a feeling of respect, bordering upon veneration, for the genius that conceived, the hand that reared, and the chisel that adorned them."

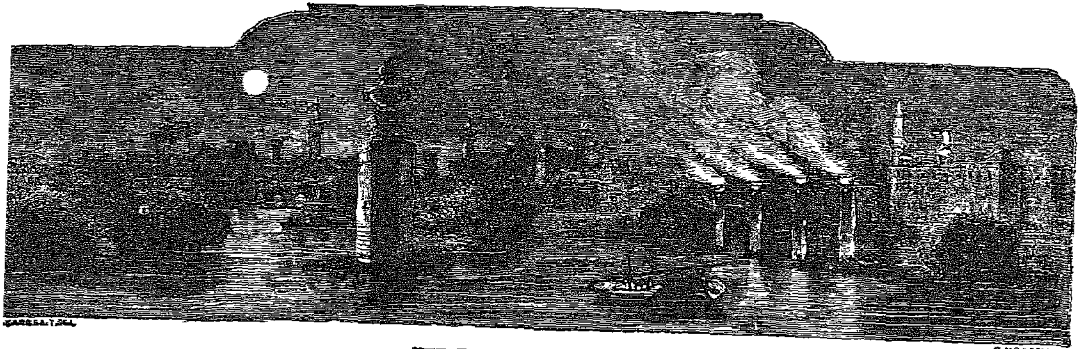
We must not linger longer amid the remains of former greatness, the tale of which is one of the great romances of history, but pass down the Nile, running below the cataracts quietly through the valley. Here the plain is ten or twelve miles broad—there the mountains rise in the distance—here the eye stretches away over far regions of barren desert—there the sand and rocks push down to the water's edge, leaving only a thin strip of cultivatable soil. At some places rise ruined temples and broken monuments, at others, thick woods obscure the view, and suddenly clearing away, expose to light level tracks of fertile fields. On either side, leading the beneficent waters into the country, are canals large and small, ancient and modern, all formed by forced labour, which would lead us far beyond our limits. On the banks, the villagers are raising water with primitive scoops, for the purposes of vegetation; or now and then employing, for the same purpose, the water-wheel, as old as holy writ, worked by oxen. Passing up and down with fruit, manufactures, and passengers, are the dabobicks, the boats of the country, of all sizes, from ten tons to one hundred, some carrying fruit, others manufactures, others again passengers, ten to one English or Americans. Some are tracking against the stream, the crew harnessed to a rope, tugging away on the bank; some are spreading their broad sails to a favouring breeze. Hark! what noise is that? A noise familiar to European ears, but sounding strangely on the ancient sacred Nile. It is a steamboat, one of those introduced by Mehemet Ali—hissing, foaming, splashing, and spluttering along, frightening the birds and scaring the crocodiles which used to be divine! That takes away the last tinge of poetry, and merges Egyptian romance in the reality of the day. So on flows the Nile through the valley to

THE DELTA,

Where the river emerges from the valley, and which is the most remarkable part of Lower Egypt. It derives its name from its triangular form, which gives it something more than a fanciful resemblance to the Greek letter Delta. It is calculated that it contains sixteen thousand square miles capable of cultivation; and is irrigated by canals branching out to the east and the west. Here on the banks of the river are villages, each house surrounded by its pigeon-house, graceful palms, tall minarets, and gardens of orange, and banana-trees. It is a land "flowing with milk and honey," where prodigal Nature scarcely asks the hand of man to bring forth her treasures. The Delta has undergone many changes. It is believed to have been formerly a gulf of the sea; the waters being shut out by the deposits brought down by the stream. It would appear that the land here is still growing, though slowly—the rise since the time of Ptolemy not being more than seven or eight feet. Its form too has varied; formerly it had several mouths, but now the river below Cairo divides itself into two branches, the Rosetta branch and the Damietta branch, which form an angle with each other. The base of the triangle is about one hundred and fifty miles in length, and the navigation of both streams is difficult and dangerous. M. Champolliott, to whom we are indebted for a great part of the information we have as to the means of deciphering hieroglyphical inscriptions, says of the view here, that it is " magnificent, and the breadth of the Nile enormous. The Pyramids tower in the west above a forest of palm trees, while a multitude of boats and other vessels cross each other upon the water in every direction. In the east, the picturesque village of Scholaaleh reveals itself in the direction of Heliopolis; and the back of the picture is occupied by Mount Mokassam, whose summit is crowned by the citadel of Cairo, and its base concealed by the numberless minarets of that great capital."

THE INUNDATION

Of the Nile is of great consequence to the inhabitants of Egypt, for upon it depends their crops. Its rising is anxiously watched both with fear and dread, for its mission is one of life or death to thousands. A few feet less, means famine; a few feet more, floods which sweep away villages. It is generally



THE RISING OF THE NILE.

supposed that the river overflows by rising above its banks, which are higher than the surrounding plain, and slope downward to the desert sand. This, however, according to Mr. St. John, the most recent writer upon Egypt, is a mistake. In his "*Village Life in Egypt*," he tells us that it percolates through the earth, and springs up from the ground in lakes. In some places, indeed, the inhabitants let the flood loose, either into the canals or the plain, by breaking through the banks; this being done at different places, at stated times, so regulated that each locality may have its fair share of the coveted waters. This is not suffered till the stream has risen to a certain height, as indicated by an instrument termed the Nilometer, the use of which goes back to the most ancient times. Bruce gives the following description of it:—"On the point of the island Rhode, between Gheeza and Cairo, near the middle of the river, is a round tower, including a neat well or cistern lined with marble. The bottom of the well is on the same level with the bottom of the Nile, which has free access to it through a large opening like an embrazure. In the middle of the well rises a thin column of eight faces, of blue and white marble, of which the foot is on the same plane with the bottom of the river. The pillar is divided into twenty peaks of twenty-two inches each. Of these peaks the two lowermost are left without any division, to stand for the quantity of sludge which the water deposits there. Two peaks are then divided on the right hand into twenty-four digits each; then on the left, four peaks are divided into twenty-four digits; then on the right four; and on the left another four; again, four on the right, which completes the number of eighteen peaks from the division marked on the pillar, each peak being twenty-two inches. Thus the whole, marked and unmarked, amounts to something more than thirty-six feet English. When the river begins to rise, its height is proclaimed from time to time." Besides this instrument for determining the height to which the Nile does actually rise, there are certain superstitious ceremonies practised, which, by the credulous, are believed to have a prophetic power as to the sufficiency or insufficiency of the inundation. It is supposed that in some years, about a certain period, a fertilizing drop of rain falls, which produces a good season; when absent, the omen is bad. To ascertain whether this drop has fallen, a number of pieces of paste, of equal weight, moulded into a given form, are exposed to the night air: and if, in the morning, one has increased in weight, then it is believed that the drop has fallen.

The rising of the Nile is attended by the keeping of

THE FESTIVAL OF THE INUNDATION,

A ceremony which Napoleon Buonaparte celebrated with great magnificence, when he invaded Egypt; and we conclude our account of the Nile with the following description, from the pen of Mr. Carne, an eye-witness of the observance. "It is the custom for a vast number of people of different nations to assemble, and pass the night near the appointed spot. We resolved to go and mingle among them, not doubting that something highly interesting would occur. We arrived at the place about eight at night, it being distant a few miles from the city (Cairo). There was firing of cannon, illuminations in *their* way, and exhibitions of fire-works. The shores of the Nile, for a long way down from Boulac, were covered with groups of people, some seated beneath the large spreading sycamores, smoking; others gathered around parties of Arabs, who were dancing with infinite gaiety and pleasure, and uttering loud exclamations of joy, affording an amusing contrast to the passionless demeanour and tranquil features of their Moslem oppressors. After some time, we crossed to the opposite shore. The scene was here much more interesting. Ranks of people were closely seated on the shelving banks of the Nile; and behind them was a long line of persons selling various articles of fruit and eatables. A little to the left, amidst widely-scattered groups of trees, stood several tents and temporary coffee-houses, canopied over, and lighted with lamps. Perpetually moving over this scene—both shores, and river, and groups of palms, being illuminated by the most brilliant moonlight—were seen Albanian soldiers, in their national costume; Nubians, from the burning clime of farther Egypt; Mamlouks, Arabs, and Turks. * * * At last day broke, and the sound of a cannon announced that the event so ardently wished for was at hand. We proceeded to the spot, around which immense crowds were rapidly gathering. The high and shelving banks of the canal into which the Nile was to be admitted were crowded with spectators. * * * The kiaya bey, the chief minister of the pasha, soon arrived with his guards, and took his seat on the summit of the opposite bank. A number of Arabs now began to dig down the dike which confined the Nile, the bottom of which was covered with a number of pleasure boats, full of people, waiting to sail down the canal through the city. Already the mound was only partly demolished, when the increasing dampness and shaking of the earth induced the workmen to leave off. Several Arabs then plunged into the stream, and exerted all their strength to push down the remaining parts: some openings were soon made, and the river broke through with irresistible violence. For some time it was like the rushing of a cataract. According to custom, the kiaya bey distributed a good sum of money,—throwing it into the bed of the canal below, where a great many men and boys scrambled for it. * * * It was an amusing scene, as the water gathered fast round them, to see them struggling and groping among the waves for the coin; but the violence of the torrent soon bore them away, and there were some who lingered to the last, and now thought to save themselves by swimming, still buffeting the waves, and grasping at the money showered down, and diving after it as it disappeared." As might be expected, this festival costs several lives every year.

WONDERFUL PLANTS.

"God of the changeful year! amidst the glow
Of strength and beauty and transcendent grace,
Which on the mountain heights, or deep below
In sheltered vales, and each sequestered place,
Thy forms of vegetable life assume;
Whether thy pines, with giant arms displayed,
Brave the cold north, or wrapt in eastern gloom,
Thy trackless forests sweep a world of shade;—
Or, whether, scenting ocean's heading breast,
Thy odoriferous isles innumerous rise,
Or under various lighter forms imprest,
Of fruits and flowers, thy works delight our eyes;—
God of all life! whatever those forms may be,
O may they all unite in praising Thee!

Roscoe.

From the hour of the world's birth, the green things of the world have played the chiefest part in moulding the dead fragments of matter into forms of beauty, and in lending life to scenes which otherwise were cheerless, barren, and the homes of death. In the dim ages of geology, plants were concerned in building up the successive plates of stony strata; they formed the huge beds of coal; they removed the noxious properties from the atmosphere, and ultimately brought the "dark, dumb earth," into a condition of rosy juvenescence, fit for the sustenance of man in a material and spiritual sense, giving food and shelter to his body, and innumerable solacing influences to his mind. With the bread which grew in the fields were mingled flowers for the joy of his soul, and as he formed the bending boughs into bowers to shelter him from the colds and heats, he at the same time inhaled a thousand odours, each of which came as a spiritual messenger to lift him out of the material life to which without such silent influences he must ever have resigned himself. In the infancy of our race, the Lord God planted a garden eastward in Eden, and there he put the man whom he had formed to dress it and to keep it, and the labour of the husbandman came to be the first and holiest birthright to which he was privileged.

Thus it has been the lot of man to spend his life in a world of flowers, and to mingle with the children of the woods and pastures the principal incidents of his fate and history. On the green plain, where mosses and summer roses bloomed, the shepherd found pasture for his sheep; on the summit of the moss-grown mountain, or under the arching boughs of the primeval forest, the priest found the necessary influences to aid in the devotions of his followers; and on the heathy moor, when strife and contention separated the families of men, the blood of the first patriots warmed; as if no scene of human life and history could be separated from the herbage and the flowers, over which, at his primal birthday, man was ordained to preside.

Hence, through all ages, plants have held close to man's heart, cheering him under trials, winning from him the free gushes of his noblest sentiments, and ministering in a thousand ways to his wants, his pleasures, and his aspirations. By that very intimacy between man and the blades of grass, certain epochs in history derive their chief illustration from the plants with which they are associated, while the most important facts of our modern civilization owe their existence to the particular growth, character, and properties of certain plants. Hence, though all the vegetable tribes are things "of beauty," and "a joy for ever," yet there are certain plants which we may here specify and describe as belonging to the kingdom of the Wonderful.

WONDERFUL TREES

Claim the first notice in this department. Trees are the princes of the vegetable kingdom: their size, their beauty, and the venerable age which they frequently attain, independent altogether of their uses and associations, render them subjects of regard both with savage and civilized peoples. It was under a plane tree that, according to Milton, Eve first saw her consort Adam—

"What could I do,
But follow straight, invisibly thus led,
Till I espy'd thee, fair indeed and tall,
Under a plantain."

It is said that Xerxes, when on his travels, met with a plane-tree, for which he conceived a passion amounting to idolatry. He pitched his tent on the spot, and passed many days and nights beside his favourite tree; and there, abandoning himself to the most reckless of absurdities, he adorned the tree with golden bracelets and other ornaments. He adored this tree for a long time, and was with difficulty torn from it by his companions. At parting he left one of the persons belonging to his suite in charge of his cherished tree, to guard and watch over it; and Herodotus tells us, that he had this plane-tree inclosed by a magnificent circle of gold. Though this love for a plane-tree has brought much odium on the memory of Xerxes, it is nevertheless extremely probable that it was no such extravagance as it appeared, being doubtless caused by some tender association or recollection of his past life, which the sight of the plane-tree awakened.

The Oriental plane is one of those trees which attain the largest size, but the rate of its increase has not been determined. In the valley of Bujukdere, nine miles from Constantinople, there is a plane of extraordinary dimensions, its circumference being 150 feet; a cavity in the trunk measuring 80 feet. Pliny tells of a plane-tree, in Lycia, which had a hollow trunk capacious enough to accommodate the Consul Licinius Mutianus and eighteen followers, who found within its ample cavity a retreat for the night. This tree was 75 feet in circumference, and the extent of its thickly-leaved boughs was prodigious. In America, the plane grows to very great dimensions. At Utica, some years ago, a hollow plane-tree was made use of as a retail shop, and afforded ample room for all the conveniences of a flourishing business. This shop was afterwards exhibited as a wonder at New York. In a description of this, as it appeared when exhibited at New York, the "New York Traveller" says—"The interior is hollowed out, and will comfortably accommodate some *forty* or *fifty* persons. It is splendidly furnished as a sitting room, and contains every article of elegance and usefulness. It has a handsome piano, sofas, glasses, and mirrors, of fit and becoming style, and is decorated with pictures and fancy articles."

Few trees, however, have higher claims to attention, whether as living records of historical events, or as wonderful natural productions, than

ANCIENT OAKS,

Which are to be found in all parts of the world, either within the shadows of the primitive forests, or on the skirts of civilized tracts, marking the spot where the forest has been mown down. A writer in the "North American Review" remarks, that the largest oak, and indeed the largest tree he has seen in that country, is an oak about twenty-seven feet in circumference at the smallest part. Its age he computes at not lest than 500 years, so that it must have been a majestic tree as the time when Columbus discovered the western world. Among remarkable English oaks, we should first mention

QUEEN VICTORIA'S TREE,

Which is the finest of the young trees in the noble park of Windsor. It has been the custom of the queens of England *to associate their names with some oak of Windsor Forest;* and Queen Victoria, on ascending the throne, offered no exception to a custom which many ages had sanctioned. If the visitor to the green glades of Windsor Great Park will take the road running parallel with the Long Walk, he will, after a journey of two miles or so, arrive at a path on the right leading to Cranbourne. Taking this Cranbourne way he will *soon arrive at a region of dark green oaks, which the woodman* has never disturbed with the axe of destruction, and where the octagon tower is all that remains of a place once celebrated as the residence of royal virtue, now remarkable as presenting the finest example of landscape in England. Crossing the Winkfield road, and passing into the opposite wood, a walk of a quarter of a mile brings us to a green walk leading into a *grand arcadia of beeches, where the thick underwood combines* with the interwoven branches in producing a delightful bewilderment. Suddenly, the grassy path spreads into a little amphitheatre; and in the midst stands a remarkable oak, straight as an arrow, wondrously tall, and without a single branch until it reaches a height of fifty feet. On the tree is this inscription—

QUEEN VICTORIA'S TREE.

It is a noble symbol of the dignity, virtue, and grace, of the beloved head which bears the crown of England, as it is also of the prospering healthiness of the nation itself. It rises erect, it lifts its broad head of fossy foliage straight up to the refreshing rain and the warm sunshine. It is the heartiest tree in the forest. Its dimensions are huge already; but *it is growing*, and there is not the slightest evidence of canker in any of its boughs. May it long survive, and bear to future generations reminiscences as happy as the name it bears promises to this!

Gilbert White tells of a "vast oak, with a short squat body," which in old times stood in the "plestor," or play-place, and covered with its branches an extent of surface measuring one hundred and thirty-two feet by one hundred and eight feet. "This venerable tree," he says, "surrounded with stone steps, and seats above them, was the delight of old and young, and a place of much resort in summer evenings; where the former sat in grave debate, while the latter frolicked and danced before them." The celebrated Cowthorpe Oak, upon an estate near Wetherby, measures within three feet of the ground forty-eight feet, and close by the ground seventy-eight feet. Its height is about eighty feet, and its principal limb extends forty-eight feet from the bole. The Greendale Oak, at a foot from the ground, is in circumference thirty-three feet ten inches. The Shire Oak, covers seven hundred and seven square yards; the branches stretching into three counties—York, Nottingham, and Derby. Damory's Oak, in Dorsetshire, was sixty-eight feet in circumference at the ground, and when decaying became hollow, forming a cavity capable of holding twenty men.

THE GALYNOS OAK,

says Mr. Jesse, in his Notes on the "Selborne Letters," was one of the largest trees of the kind in England on record. It grew in the county of Monmouth. Five men were each twenty days in stripping and cutting it down; and a pair of sawyers were employed one hundred and thirty-eight days in cutting it into planks. The expense of this alone was 82*l*. The main trunk of this tree was nine feet and a half in diameter. It had been improving for four hundred years, as found by the rings in its butt. When standing, it overspread four hundred and fifty-two square yards. Its produce was two thousand four hundred and twenty-six feet of solid timber. The bark produced six hundred pounds. A very good idea of the size to which oaks will attain, is furnished by the fact that the "Royal Doverling," a frigate-of-war, built for Charles the First, was provided with the whole of its uprights from one oak, which *supplied entire planks of sufficient size and number.* Four of the beams of this oak were each eighty-four feet in length, and four feet nine inches in diameter. The tree that served for the mainmast of this ship, was ninety-nine feet long and thirty-five feet in diameter.

THE FAIRLOP OAK

Has an interest beyond the age and size which it attained, and affords one of the most amusing instances of the growth of popular customs which can be cited. This oak was situated in Hainhault Forest, Essex, and measured at a yard from the ground thirty-six feet in circumference. In an account of this tree, by Mr. Shirley Hibberd, published in "Notes and Queries," he says, "The *stem of this vegetable prodigy, which was roughly hollowed, measured at three feet from the ground* about thirty-six feet in girth, and the boughs extended about three hundred feet in circumference. A fair was established on this spot about the year 1720, by Mr. Daniel Day, block-maker, of Wapping, who gave his men an annual bean-feast, under the shade of the oak, on the first Friday in July; and which has been visited for a number of years by the block-makers and watermen of the eastern part of the metropolis. A few years before Mr. Day died his favourite oak lost a limb, out of which he procured a coffin to be made for his own interment, and often used to lie down in it, to try how it would fit him. He died October 13th, 1767, aged 84, and his remains were conveyed to Barking by water, accompanied by six journeymen block and pumpmakers, to whom he bequeathed a new leathern apron and a guinea." After Daniel Day's death, the tree was destroyed by the brutal carelessness of the Londoners who resorted to Fairlop Fair. Bonfires were lighted around the tree, and within the hollow cavity of the trunk itself, and in 1805, a party of cricketers left a fire burning in it, which lasted till the next morning. Ill usage having reduced it to a mere ghost of its former glory, the high winds of February 1820 "stretched this forest patriarch on the ground, after having endured the storms of perhaps a thousand winters."

GOFFE'S OAK, AT CHESHUNT,

Is another fine example of the magnitude to which the oak attains in this country.

This tree is situated on Cheshunt Common, in one of the most delightful spots within reach of the Londoner. The scenery in every direction from this spot, is of the most enchanting character. Woody hills rising in bold outlines, deep green valleys studded with the white fleeces of the homely sheep, and wide slopes of ridgy wheat alternating with cottages and farmsteads, afford a variety which is inexhaustible and of a character most truly English. The tree stands on a spot of ground which is a centre from which diverge a number of roads, each leading to some sylvan solitude, or some quiet region of mossy orchards, or gaily-coloured fields rife with the tokens of cultivation and industry; while beside the tree itself stands the homeliest of English inns, where social comfort sits beside the goddess of health—both rosy-cheeked matrons—and provide for the traveller the blessings, without the evils, of a licensed victualler's hospitality. The tree is hollow, and is capable of seating six or eight persons. Its circumference near the root is twenty-six feet; and its branches bear every year a good head of foliage and an abundance of acorns. It takes its name of "Goffe's Oak" from one of the followers of William the Conqueror, Geoffrey Goffe, or Guffley, who received the gift of certain lands in the neighbourhood as a reward of his valour on the field of Hastings. The original inn was destroyed by fire many years ago; but another similar to it stands on the site. As Cheshunt is only thirteen miles from London, on the Eastern Counties' line, it affords a good opportunity to Londoners to make acquaintance with one of the few relics of antiquity which now remain to us.

GIGANTIC CYPRESSES

Are by no means rare in Mexico. At Allexo there is one seventy-six feet in girth, and another at St. Maria del Tuli, in the province of Oaxaca, which is one hundred and eighteen feet in circumference. "On examining this carefully," says Humboldt, "what excites the admiration of travellers is, that not a single individual, but that three united trunks form the famous *Sabino of Santa Maria del Tuli*." The most gigantic, as well as the oldest tree in the world, are each to be found among the cypresses.

THE LARGEST TREE IN THE WORLD

Is a cypress at Chapultepec, in the same region, which is said to be one hundred and seventeen feet ten inches round, consisting only of one stem.

THE OLDEST TREE IN THE WORLD

Is also a cypress; but situated in the Old World. This is certainly the oldest tree of which there is any authentic record: it stands in Soma or Somma, in Lombardy, and is generally supposed to have been planted in the year of the birth of Jesus Christ, and on this account is treated with great reverence by the inhabitants of the place. Abbé Berlèze, however, says, that there is a chronicle extant at Milan, which proves that it was a tree in the time of Julius Cæsar, forty-two years before Christ.

Of the noble character of the cypress, Miss Landon has sung melodiously—

Thou graceful tree,
With thy green branches drooping,
As to yon blue heaven stooping,
In meek humility.

Like one who patient grieves,
When winds are o'er thee sweeping,
Thou answerest but by weeping;
While tear-like fall thy leaves.

When summer flowers have birth,
And the sun is o'er thee shining;
Yet with thy slight boughs declining,
Still thou seek'st the earth.

Thy leaves are ever green:
When other trees are changing,
With the seasons o'er them ranging;
Thou art still as thou hast been.

Thou wert made to wave,
Patient when winter winds wave o'er thee,
Lowly when summer suns restore thee,
Upon the martyr's grave.

The chestnut is another tree which attains a giant magnitude and a hoary age. In the forest of Dean, at Enfield Chase, and in many parts of Kent, very fine specimens are to be seen. *At Hitchin Priory, in Hertfordshire, a tree stood which, in 1789, measured forty-two feet at five feet from the ground.*

THE GREAT CHESTNUT OF FORTWORTH,

In Gloucestershire, is the most remarkable chestnut in this country. At the present time it measures fifty-two feet in circumference, and is proved to have stood there in 1150, when it was already known as the "great chestnut." Mr. Marsham reckons that this tree is eleven hundred years old. This tree is remarkably beautiful. The shadows which it projects are so ample and finely chequered with dancing sunbeams, that deer and sheep, who seem to have a taste in such matters, select it in preference to all others for the noontide *siesta*, or evening *rumination*. In the autumn, its leaves, beautiful in death, array themselves in every variety of yellow, the Chinese mourning colour; and, hanging gracefully round its large green clusters of nuts, form a charming variation to the flaming reds of the dying beech, and the pale and sickly greens of the planes and sycamores.

"E'en winter oft has seen it gay,
With fretted frost-work spangled o'er;
While pendants droop'd from every spray,
And crimson budlets told once more
That spring would all its charms restore."

THE CHESTNUT OF MOUNT ETNA

Is a very celebrated tree. It is called by the Italians, *Castagno*

THE GREAT CHESTNUT OF FORTWORTH.

de cento cavallo, "the chestnut of a hundred horses." The reason of its being so called is, that Jane, queen of Arragon, when on her voyage from Spain to Naples, landed in Sicily for the purpose of visiting Mount Etna. She was accompanied with one hundred attendants on horseback, who, with her, found shelter within the trunk of this enormous tree during a storm. The circumference of this immense tree was one hundred and sixty-three feet. Though the heart of the trunk is decayed, and a public road leads through it, wide enough to admit two carriages abreast, yet the tree is still yearly adorned with rich foliage. and produces a vast quantity of nuts, which are gathered and preserved by some persons who inhabit a small hut built amongst its branches. It is believed to be more than a thousand years old.

Having treated thus far of ancient and gigantic trees, let us turn to another department of our subject, and gather a few facts illustrative of the varieties of form and organization observable in plants. Commencing with trees, we have again to deal with magnitude and age, though it is our object now to treat of the wonderful as manifested in the characteristics of *development and growth.* Not the least curious, as a sample of the freaks of Nature, is that furnished by the

MANGROVE,

Which is a tree found in great plenty in the East and West Indies. The mangrove rises to a height of sixteen or eighteen feet, and is found most plentifully in the muddy shallows by the seashore, where it seems as if possessed of reasoning faculties, for it grows as it were on stilts, that is, lifted up from the mud by a peculiar growth of its roots.

"These strange trees," says Mr. Gosse, "belt the shore of the island in various parts, and stretch so far out into the mud of the shallows as to appear to spring directly out of the sea. The trunk of every tree springs from the union of a number of slender arches, each forming the quadrant of a circle, whose extremities penetrate the mud. The larger ones send out side shoots, which take the same curved form at right angles; and thus, by the crossing of the roots of neighbouring trees, a complex array of arches is produced, on which one may securely walk for hundreds of yards, probably in some places for miles, about eighteen inches above the mud, or above the surface of the water when the tide is in. Another curious fact in the history of these mangroves is, that the long, club-shaped seeds germinate and grow before they fall from the branches; those which are produced near the mud striking their roots into it, and those which grow in the higher branches forming their roots before they fall, when, dropping into the mud beneath, they form individual trees, lifted on arched roots in the same way as their parents."

THE MANCHINELL

Derives its fame from its well known deadly qualities. It is found most plentifully in the Antilles islands, on the borders of the sea. The leaves, sap, and fruit, are all equally poisonous, and are used by the Indians to poison their arrows. To sleep under its shade is considered extremely dangerous: a wound from an arrow poisoned by it is inevitably fatal; and the sap getting into the eyes during the process of felling, is almost certain to entail death on the victim. It was formerly the custom to condemn criminals to fetch a certain portion of the juice for the purpose of poisoning arrows; and it is said that few of these returned alive. A story is frequently told of a traveller who laid down to rest under this baneful tree, and received some drops of the dew from it on his face, which immediately blistered, and left indentations like the small-pox. In Southey's "*Life of Lord Nelson*," a somewhat similar incident is recorded as having happened to the great admiral. "In one of Lord Nelson's earliest expeditions," says Southey, "he suffered from poison: for drinking at a spring in which some boughs of the manchinell-tree had been thrown, the effects were so severe, as, in the opinion of some of his friends, to inflict a lasting injury on his constitution."

THE DRAGON-TREE

Is of more importance, owing to its use in the arts. The dragon-tree resembles the palm in the nature of its growth and aspect. It is found in Africa, China, and America. It derives its name from a real or fancied resemblance of its fruit to the fabulous dragon of antiquity, the figure of which is said to be plainly discernible on the fruit, when the rind is removed. The juice or resin of the tree, is the dragon's blood of commerce. A solution of dragon's blood in spirits of wine is used for staining marble, to which it gives a red tinge, which penetrates more or less deeply, according to the heat of the marble during application. It is also used for giving a richer tinge to mahogany, and for staining other woods of a crimson tint. Its uses in medicine are numerous.

THE GREAT DRAGON-TREE OF TENERIFFE

Is a tree of great renown, and has been described by many recent travellers. Its wonderful size and majestic appearance excited the admiration of Humboldt, who thus describes it:—"We were told that the trunk of this tree, which is mentioned in some very ancient documents as marking the boundaries of a field, was as gigantic in the fifteenth century as it is at the present moment. Its height is about fifty or sixty feet; its circumference at the root is forty-five feet. The trunk is divided into a great number of branches, which rise in the form of a candelabrum, and are terminated by tufts of leaves, like the Yucca, which adorns the Valley of Mexico. It still bears, every year, both leaves and fruit. Its aspect feelingly recalls to mind "that eternal youth of nature which is an inexhaustible source of motion and life."

There are few trees of greater note, though of less real interest, than the

UPAS, OR POISON-TREE OF JAVA,

Which a few years since terrified the whole of Europe with its awfully tragic, though fictitious fame. The first account of this tree was introduced into Europe by some Dutch seamen, and was afterwards enlarged and repeated by one Foersch, who published his fabulous narrative in 1783. In 1785, this narrative was published in the "London Magazine," and was received with implicit faith, and soon became a story of horror to frighten children, and excite the morbid sentiments of grown people.

Foersch, who had been third surgeon to the Dutch forces at Samarang, says, that having attained the rank of principal surgeon, he determined to travel into the interior of the island, which had then been visited by few Europeans. It was after his return from these travels that he drew up his account of the tree, which he introduces with this assurance: "I will relate only simple and unadorned facts, of which I have been an eye-witness,—the reader, therefore, may depend on the accuracy of my account."

According to this account, the dreadful poison-tree was situated at the distance of twenty-seven leagues from Batavia, and only fourteen leagues from Soura-Charta, the place of the emperor's residence. It grew in a deep valley, entirely surrounded by barren mountains. Foersch set off and travelled entirely round the mountains that enclosed the Upas valley, *keeping always at the distance of eighteen miles from its centre*,—an operation which we can account for, only by supposing him endowed with mathematical instinct, for he did not know where the centre of the valley was!

At court, a Malay priest had furnished him with a letter of introduction to another Malay priest, considerately placed by the emperor to prepare the souls of the criminals who were sent to gather the poison of the tree. This shriving priest, he says, lived at a place fifteen or sixteen miles from the tree, and was very kind and communicative. He informed Foersch that he had held his sad office for thirty years, during which time he had despatched seven hundred individuals to the Upas, of whom not two in twenty had returned. The veracious surgeon had, of course, learned before that only criminals who had incurred capital punishment were sent on this most perilous errand.

When the victims of justice, the story continues, have chosen this lot, they are generally instructed how to proceed with the greater chance of safety, and individually presented with a silver or tortoiseshell box, in which they are to deposit the poison. They then put on their best clothes, and journey, accompanied by their friends and relatives, as far as the residence of the priest: there that holy man furnishes each of them with a pair of leather gloves, and a long leather cap which descends as far as the breast, having two eye-holes with glasses, to permit the wearer to see. When thus accoutred, the priest repeats the instructions for the journey, and after taking leave of their weeping friends, the criminals *ascend a particular mountain pointed out to them—then* descend on the other side, where they meet a rivulet, whose course they are to follow, as it will guide them to the tree.

Foersch asserts that he was present at one of these melancholy departures from the old priest's house, and had such close communication with the victims, that he gave them some silken cords wherewith to measure the tree, and earnestly requested them to bring him back some piece of the wood, or a small branch, or a few leaves of the Upas. He obtained, however, only two dry leaves, with the scanty information that the tree was one of middling size, with five or six young ones of the same kind growing close by it. A continual exhalation (according to the few who returned) issued from the tree, and was seen to rise and spread in the air, "like the putrid steam of a marshy cavern." Whatever this vapour, or the miasmata from it, touched, it killed; and as they had cursed that spot for centuries, not a tree, save the Upas and its progeny—not a bush, nor a blade of grass was found in the valley, nor on the surrounding mountains, for a circuit of many miles. All animal life was equally extinct—there was not a bird of the air to be seen—not a rat, nor a mouse, nor any even of those reptiles that swarm in foul places. In the neighbourhood of the tree the barren ground was covered with dead bodies and skeletons—the remains of preceding criminals. This was the only circumstance that showed animate beings had ever been there; and as the birds and beasts of prey and the consuming worms could not batten in that valley of death, those ghastly relics would long remain unconsumed, to warn every new comer of his all but inevitable fate.

After many minor details of the wonderful effects of the tree upon the spot where it grows, Foersch proceeds to inform his readers that the poison used artificially by the people of Java is the gum of the Upas mixed up with citron-water, &c., and goes on to describe its lightning-like rapidity of effect in this form. He says, he was present at the execution of thirteen women of the palace, convicted of infidelity to the emperor's bed—that these victims, being slightly wounded by a krise, or Malayan dagger, whose point had been dipped in the poison, instantaneously suffered the greatest agonies, and were all dead within sixteen minutes. He is positive as to the number of minutes, for, says he, "I held my watch in my hand all the time." He adds that a fortnight after he saw seven Malayans executed in the same way.

At length, during the English occupation of Batavia, we obtained a correct description of the poison-tree of Java, which, *in all likelihood, is the same as that found growing in Macassar* and other places in the Indian seas. This description was furnished by Dr. Horsfield, and will be found, with all its scientific detail, in vol. viii. of "Batavian Transactions," or, as quoted in a note, in Sir Stamford Raffles' splendid work on Java. We merely abridge the doctor's account, begging our readers to remember the particulars hitherto mentioned. Our author says, that though Foersch committed an extravagant forgery, yet the existence of a tree in Java, from the sap of which a fatal poison is prepared, is a fact. This tree is the "Anchar," which grows in greatest abundance at the eastern extremity of the island. It belongs to the twenty-first class of Linnæus, or the Monœcia. The male and female flowers are produced on the same branch at no great distance from each other; the females being in general above the males. The seed-vessel is an oblong drupe, covered with the calyx; the seed, an ovate nut with cell. The top of the stem sends off a few stout branches, which spreading horizontally with several irregular curves, divide into smaller branches, and form an hemispherical, not very regular, crown. The stem is cylindrical, perpendicular, and rises completely naked to the height of sixty, or seventy, or even eighty feet; near the surface of the ground it spreads obliquely like many of our large forest trees. The bark is whitish, slightly bursting into longitudinal furrows. Near the ground this bark is, in old trees, more than half an inch thick, and when wounded, yields copiously the milky juice from which the poison is prepared. This juice, or sap, is yellowish, rather frothy; and when exposed to the air its surface becomes brown. In consistence it is much like milk, but thicker and more viscid.

In making his numerous experiments on the tree, Dr. Horsfield had some difficulty with his native labourers, who feared a cutaneous eruption, but nothing more. Now, we may mention here, that this eruption, and other symptoms, are produced by the well-known Chinese varnish-tree, whose sap, like that of this poison-tree, is procured by making incisions in the trunk.

The anchar is one of the largest trees in Java; it delights in a fertile, not very elevated, soil, and is found only in the midst of the largest forests! "It is," says Dr. Horsfield, "on all sides surrounded by shrubs and plants, and in no instance with barren desert." The large specimen he saw was so embosomed in common trees and shrubs that he could hardly approach it; wild vines and other climbing shrubs, in complete health, adhered to it, and ascended half the height of its stem. While he was collecting its sap he observed several young trees that had sprung up spontaneously from seeds dropped by the parent plant.

Rumphius, the naturalist, saw the effects of the poison on human beings, when, in 1650, the Dutch in Amboyna were attacked by the Macassans, who used arrows dipped in this or some very similar preparation. "The poison," says he, "touching the warm blood, is instantly carried through the whole body, so that it may be felt in all the veins, and causes an excessive burning, particularly in the head, which is followed by sickness and death."* After it had thus proved fatal to many Dutch soldiers, who trembled at its name, and no doubt were the first to exaggerate the horrors of the tree that produced it, they discovered an almost infallible remedy in a root—the Radix toxicaria of Rumphius—which, if timely applied, counteracted by its violent emetic effect the force of the poison.

From this list of noxious plants, we turn to some few which are wonderful for their beneficial properties; and the first which claims attention in this department, is the

BREAD-FRUIT TREE,

First described by Dampier, as "a certain fruit called the *bread fruit*, growing on a tree as big as an apple-tree, with dark leaves." Captain Cook was the first who furnished a fair account of this tree, which flourishes in the islands, of the South Seas, and in various parts of the East and West Indies, to both of which districts it has been introduced from Otaheite, and the surrounding islands. The tree is about the size of a middling oak; its leaves are frequently a foot-and-a-half long, and of an oblong shape; deeply simulated, like those of the fig-tree, which they resemble in colour and consistence. The fruit is about the size and shape of an infant's head; and the surface is reticulated and covered with a thin skin. Within is a core, about as large as the handle of a small knife, and the eatable part of the fruit lies between the skin and the core. When roasted, the inner eatable portions resemble the crumb of new bread, both in appearance and flavour. When baked, it is somewhat like a boiled potato. It is frequently beat up with water, or the milk of the cocoanut, and then mingled with bananas or plantains, and thus composes a dish called *mahie*, which is considered by the natives a great delicacy. The fruit is in season eight months in the year, during which time it is eaten fresh by the natives. During the other four months it is eaten in a preserved form; numbers of the fruits being thrown into pits just before ripening, and undergoing a fermentation in these pits, are brought out for consumption when the season of fresh fruit ceases, and then supply the natives with their principal food. In the whole range of the vegetable kingdom, there is no more beautiful instance than this of the direct provision for man, for we have here a substance akin to bread produced in a country where the corn plants were wholly unknown, until Europeans introduced them.

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* *Herbarium Amboinense.*

> "The bread-tree, which, without the ploughshare, yield
> The unreaped harvest of unfurrowed field,
> And bakes its unadulterated loaves
> Without a furnance in unpurchased groves,
> And flings off famine from its fertile breast,
> A priceless market for the gathering quest."—BYRON.

Similarly useful is the

MOUNTAIN CABBAGE-TREE,

Which is the only one of the palm family which need be noticed here, as previous articles have been devoted to that family of plants. Mr. Pinckhard, in his Notes on the West Indies, says, "This magnificent palm is unquestionably the finest tree that is known. From words, or drawings, only an imperfect idea of it can be collected. To comprehend its fine symmetry, its grandeur, and majestic loftiness, it must be seen. Its trunk is very smooth, and almost regularly cylindrical, rising into a superb and stately pillar, resembling a well-hewn column of stone. At the base, its circumference is somewhat greater than at any other part, yet lessening so gradually upwards, as to preserve the most just and accurate proportion. Not a single branch, not even the slightest twig, interrupts the general harmony of the trunk, which often rises, in a correct perpendicular, to the height of from sixty to a hundred feet, and then spread its palmated foliage into a wide and beautiful radiated circle. Branches it his none, but the fine expansive leaves, shooting immediately from the summit of the trunk, extend around it, crowning, and as it were, protecting the massy column, in form of a full-spread umbrella.

"It may, perhaps, be thought, that our noble English oak, with all its rude and crooked limbs, must be a more picturesque object. So it is, and so is likewise the wide-branching silk-cotton: but the loftiness, the stately grandeur, the exact proportion, and the deep-shading foliage of the mountain-cabbage are unequalled, and, in their happy combination, crown this tree the king of the forest,—the most exalted of the vegetable world.

"When planted in avenues, it forms a grand and imposing approach to a dwelling, conveying an air of greatness to the mansion which it adorns. It grows, free from decay, to a very old age, but cannot be converted to the useful purposes of timber. It is a tree of state, calculated to enrich and augment the magnificence of a palace: nor let it detract from its majestic qualities, to know that, after all, it is but—*a cabbage-tree!* Its loftiest summit is a spiral succulent shoot, the sides of which, by gradually and successively unfolding, form the fine wide-spreading foliage. Before this opens, to expand itself around, it is a congeries of young and tender leaves, in which state it is often boiled, and brought to table as a cabbage, of which it is the very best kind I ever remember to have tasted. It is also used, without boiling, by way of salad, and is then eaten with oil and vinegar; and so highly is it esteemed for these culinary purposes, that, too often, a very fine tree has been devoted to the axe, merely because no other means could be found of obtaining, from its towering summit, this most excellent cabbage."

Mr. Barrow, in his voyage to Cochin-China, in describing the fruits produced in the island of Jâva, says, "Of all the delicious fruits that are produced in the East, perhaps we may venture to say, in the whole world,

THE MANGOOSTAN,

May fairly set up its claim to the preference. The tree on which it grows, though not magnificent, is extremely beautiful, bearing, like the orange, both fruit and flowers at the same time, on the extremities of the branches. This fruit is no less fascinating to the eye than it is gratifying to the taste; its form is round, generally a perfect sphere; the colour, a bright or dark purple, according to the degree of ripeness; it rests in a permanent green calyx, and the upper part is surmounted by a corona, which is generally divided into as many rays as the fruit within consists of lobes, which are of a delicate white pulpy substance, covering each a small nut. The husk, or shell, contains a brown astringent juice, which, with oxyde of iron, makes a clear shining ink of a deep purple. The mango is another fruit of exquisite flavour, when of a good sort, but of that peculiar taste which is not relished by every palate. It grows on a large spreading tree, not unlike the walnut. The Rambootan, or hairy plant (the Nephelium echinatum), and the Prolasang, (a larger species of the same genus) are cool and agreeable fruits, of a delicate sub-acid flavour, highly refreshing in a warm climate. The trees on which they grow are showy, free, and elegant. The leaves of the prolasang are much narrower than those of the rambootan; the fruit is much larger, and wants those hairy spines which cover the latter. Oranges, lemons, citrons, and shaddocks, are plentiful in the gardens about Batavia; so also is the Eugenia or rose-apple, of which there are two species: the Averhoa, consisting likewise of two species, the Carambola, which is used for tarts, and the Behunny as a pickle, guavas, armonas, dates, and bananas. The Atrocarpus, or jack-fruit, grows wild in great plenty, as does also a large fruit called the Doorian, whose smell is extremely disgusting, and flavour somewhat like what one might suppose the taste to be of a custard seasoned with garlic; but both the taste and the smell are said, not only to lose their offensive qualities, by frequent use, but to become extremely fascinating. The fragments, however, of this fruit are strictly prohibited from being thrown into the streets, nor are they suffered to remain about the stalls in the market, on account of the fetid smell which, when in a state of putrefaction, is supposed to taint the air, and render it injurious to health. A fruit, called the Boa lansa, is in great estimation among the several classes of inhabitants. It grows in clusters like grapes, upon a tree of moderate size. Each individual fruit bears a resemblance to the famous Li-tchi of China, being a pulpy substance of a delicate sub-acid taste, comprehended within a thin crustaceous covering. Pine-apples are produced in such abundance that they are sent into the city, like turnips to Covent Garden, piled up in carts. As a fruit, they are not much esteemed, except for preserving in sugar. Their acid juices are employed for removing rust from sword-blades, knives, and other articles of polished iron. Most of the fruits of Europe have been transplanted hither, but as might be expected, they dwindle and degenerate in an equinoctial climate."

But the most extraordinary plant that occurred, and which is said to be very common in most of the Eastern islands, was the

NEPENTHES DISTILLATORIA;

or, Pitcher Plant. There is not, perhaps, among the numerous examples that occur of the provident economy of nature, in the vegetable part of the creation, a more remarkable instance of contrivance adapted to circumstances of means suited to the climate, than what is evidently displayed in this wonderful plant. Being an inhabitant of a tropical climate, and found on the most stony and arid situations, nature has furnished it with the means of an ample supply of moisture, without which it would have withered and perished. To the footstalk of each leaf, and near the base, is attached a small bag, shaped like a pitcher, of the same consistence and colour of the leaf in the early stage of its growth, but changing with age to a redish purple; it is girt round with an oblique band or hoop, and covered with a lid neatly fitted, and movable on a kind of hinge or strong fibre, which, passing over the handle, connects the vessel with the leaf. By the contraction of this fibre, the lid is drawn open whenever the weather is showery, or dews fall, which would appear to be just the contrary of what usually happens in nature, though the consideration probably is occasioned by the hot and dry atmosphere, and the expansion of the fibre does not take place till the moisture has fallen and saturated the pitcher. When this is the case the cover falls down, and it closes so firmly as to prevent any evaporation from taking place. The water, being gradually absorbed through the handle into the footstalk, gives vigour to the leaf and sustenance to the plant. As soon as the pitchers are exhausted, the lids again open to admit whatever moisture may fall; and when the plant has produced its seed, and the dry season fairly sets in, it withers, with all the covers of the pitchers standing open. Why the name of Homer's grief-dispelling plant, should have been transferred to the pitcher plant, I am unable to explain; but it does not appear to be possessed of any sedative or narcotic qualities, like

> "That Nepenthes which the wife of Thone
> In Egypt gave to Jove-born Helena."

Leaving fruits, and seeking for the wonderful in other forms, we meet with it in

THE PAPYRUS

Of Egyptian history, which bears upon its graceful head the memories of thousands of years, and associates itself with the earliest efforts of men to embody their ideas in written language. From the *papyrus* we have the modern word *paper;* the plant having furnished the first material for writing on. The time is not known when the papyrus was first used for making paper. Varro dates the discovery from the time of Alexander the Great, when that prince founded the city of Alexandria in Egypt; but Pliny endeavours to establish a contrary opinion, and refers it to a more remote period, upon the authority of several Greek authors, who lived before the time of Alexander, and who spoke of the papyrus. The composition which the Egyptians used for ink must have been of a very durable nature, since a book which had probably lain for centuries was still as legible as ever. Some years ago there was to be seen, in the Abbey of Saint Germain-des-Pres, part of the epistles of Saint Augustine, written on Egyptian paper, occasionally interleaved with parchment; although the manuscript was eleven hundred years old, yet the letters had preserved their blackness. In preparing the paper the thick part of the stalk was cut in two, the pellicle between the pith and the bark stripped off and squared into a riband. Several of these ribands were laid on a table side by side, and then a series laid over them transversely. The paper prepared in this manner had therefore the thickness of two ribands of papyrus.

The Egyptians applied the papyrus to several purposes independent of the manufactory of paper. The roots sometimes served them for firewood, and were frequently formed into different domestic utensils. Of the stems, interlaced together, they constructed a kind of boat; and of the interior bark they made their sails, their mats, their clothes, their cordage, and the coverlets of their beds. The boats made of the papyrus, resembled great baskets compactly woven together, and plastered with a resinous substance. It was probably in a vessel of this kind that Moses was exposed, when he was found by the daughter of Pharaoh on the banks of the Nile. Although Pliny has expressly called these boats *Naves papyraceæ,* we are not to believe that they were constructed entirely with the stems of this plant; for they were partly formed of a thorny kind of wood. The ancient Egyptians pretend that the crocodiles, out of respect to the goddess

THE PAPYRUS.

Isis, who was once afloat in one of these barks, will never hurt those who steer their vessels in her manner.

The inhabitants on the borders of the Nile eat the lower and succulent parts of the stem of the papyrus, after having baked it to make it more palatable; and they express the antiquity of their origin, hieroglyphically, by a fagot of papyrus, because they consider the plant as having afforded nourishment to their forefathers.

Bruce thus describes the papyrus plant—"The head is composed of a number of small grassy filaments, each about a foot long. About the middle, each of these filaments parts into four, and in the point or partition are four branches of flowers; the head of this is not unlike an ear of wheat in form; but which in fact is but a chaffy, silky, soft husk. These heads or flowers, grow upon the stalk alternately, and are not opposite to, or upon the same line with, each other at the bottom. The stalk is of a vivid green colour, thickest at the bottom, and tapering up to the top; it is of a triangular form. In the Jordan, the single side, or apex of the triangle, stood opposite to the stream, as the cutwater of a boat or ship, by which the pressure of the stream upon the stalk would be greatly diminished!

THE BAMBOO

Is a species of grass of gigantic dimensions, found in great plenty in the tropical parts of the Old and New World, especially in India and China. A native of the warmer climates only, though often growing luxuriously between the tropics, the bamboo rises to the height of forty, sixty, or even eighty feet, with a slender, hollow, shining stem. Many, however, are only twelve or fifteen feet high; and those which attain the greatest height here mentioned are rather to be viewed as overgrown. The stem is exceedingly slender — sometimes not exceeding the thickness of five inches in those which are fifty feet high; in others, being fifteen or eighteen in diameter; the whole divided into joints, separated by knots, or 'internodes, between which are distances varying from a few inches to several feet. Alternate branches spring from the base to the top, which, with the pointed leaves of the knots, give the whole tree a most elegant appearance.

It will sometimes vegetate three or four inches in a single day, and it has been seen to rise twenty feet, and as thick as a man's wrist, in five or six weeks. Its full dimensions are frequently, therefore, attained in a year; and the only change afterwards is greater thickness, and induration of the wood. Towards the root it is solid and compact; and the cells of the stem become wider in proportion as they ascend. In Malabar, it is said to bear fruit when fifteen years old, and that it then dies.

Describing the wonderful vegetation of the island of Jamaica, Mr. Gosse says—" Towering up with palm-like grace—though allied rather to the grasses in its economy—the bamboo gives a peculiar tone to the scenery of many parts of the island. It is scattered over all kinds of situations, from the most elevated summits, which its tuft adorns with becoming crowns, to the green plains beside the sea, where it arches over the pathways into bright, green, interlacing avenues, under whose grateful shadow the traveller may journey for miles, secure from the debilitation of the vertical sun. A beautiful contrivance connected with the growth of the bamboo may be seen in these bamboo-walks, which affords a new illustration of the inexhaustibility of contrivance in every department of nature. Looking at a dense bamboo clump we see polished, rigid stems standing but a foot, or less, apart, each bristling with stiff branches, shooting out horizontally in every direction, and proposing to us the puzzling question, How is it possible for fresh stems to rear themselves through such a labyrinth of crossed and recrossed branches? The ways of nature, however, are extremely simple. The new stem shoots up from the earth and attains its lofty stature before a single lateral branch has budded. In this simple form its sharp top and polished surface find no difficulty in threading their crossed branches; and, when once its elevation is gained, the lateral branches find their horizontal course no less unresisted.

The earliest shoots of this plant are edible, and are served up at table in autumn like asparagus; in a similar manner with that vegetable, also, they are earthed over to keep them; they are also salted, and eaten with rice. A fluid of grateful taste and odour is yielded from the hollow joints as the plants grow up, affording an agreeable beverage. In its further progress, this becomes a concrete substance, called tabaxir, or tabascheer, highly valued for its medicinal properties, and, apparently, a species of siliceous earth. It resists the impression of acids, is indestructible by fire, and, with alkalies, forms a transparent glass. A decoction of the leaves of the bamboo is recommended in the East for coughs and a sore throat; the bark for fever and vomiting; the buds as a diuretic; and a compound of the root with tobacco-leaves, betel-nut, and oil, forms an efficacious ointment. Many of the poorer classes in the most populous countries subsist entirely upon it in times of scarcity. The Hindus eat its seeds roasted, mixed with honey, as a delicacy, equal quantities of each being put into a hollow joint, coated externally with clay. From the copious draught which a joint of the bamboo naturally yields, mankind are taught its use as a vessel for carrying water, and in some places no other bucket is employed.

THE ALOE

Is a native of all the southern parts of America, and has been introduced into several parts of Europe. In the natural system of botany, the aloe is closely associated with the lilies, and is arranged in the same order as the African lily and the tuberose. It is a glorious plant when in flower, and has justly obtained the admiration of naturalists. Its tall stem and head of blossoms, which, to add to its wonderful properties, is said to appear but once in a century, make it a still greater object of curiosity. The stem generally rises upwards of twenty feet high, and branches out on every side towards the top, so as to form a kind of pyramid. The slender shoots are garnished with greenish yellow flowers, which come out in thick clusters at every joint, and continue long in beauty; a succession of new flowers being produced for near three months in favourable seasons, if the plant is protected from autumnal colds. The elegance of the flower, and the rarity of its appearance in our cold climate, renders it an object of such general curiosity, that when it blossoms in this country, it is considered as a public event, and thousands flock to see what may well be regarded as one of the finest sights in the world.

We remember such an incident occurring in a garden at Stepney some twelve years since, which attracted thousands of persons during the four or five weeks it continued in bloom. The appearance of the noble head of blossoms, rising on a pillar from the bosom of the spreading leaves, was so grand as to surpass everything of the same kind within our memory. The popular opinion that it blossoms but once in a hundred years is without foundation, as is also that of the blossoms opening with a noise like the report of a cannon. The truth is, that in this climate it takes many years to come to perfection, and hence seldom blossoms; but in its native sultry plains it expands many leaves every season, and flowers regularly every season when five or six years old.

The leaves of the American aloe are five or six feet long; from six to nine inches broad, and three or four thick. They contain a vast quantity of mucilaginous fluid, surrounding an immense quantity of parallel threads, which, when separated, and properly manufactured, serve the purposes of hemp, being used for cordage, and to make packing-cloths. The leaves are always employed in America in this manner; and it is not long ago that they used them for the same purpose in Spain. To extract the flax from the leaves they are passed through rollers, and afterwards washed and combed by the workmen.

The aloe which affords the valuable medicinal gum must not be confounded with the plant we have just described. The aloe of medicine is a native of Africa; the best sort being produced in the island of Socotora, where the juice is prepared for the druggist. The importance of this is so great that its exportation forms an important branch of commerce.

We have now to describe a few plants which derive their interest from the wonderful character of their flowers Undoubtedly the flower most renowned in the history of the past, as a symbolical object, is

THE LOTUS,

Which plays an important part in the mysteries and religious solemnities of the East. Its sacred leaf was the

Emblem and cradle of creative Night.

It was anciently revered in Egypt, as it is at this day at Hindostan, Thibet, and Nepaul, where they believe it was in the consecrated bosom of this plant that Brahma was born, and on which Osiris delights to float. Naturalists have differed in opinion whether the celebrated Lotus was a herb, a flower, or a tree. Some authors have affirmed that it was a rough thorny shrub, the seeds of which were used to make bread; but the testimony of Herodotus, that the lotus is a species of water-lily, which grows in abundance in the Nile during the inundations, is so very conclusive, that no other solution of the question can be accepted. Herodotus bears testimony to the high antiquity of the Egyptian veneration for the lotus, and M. Savary assures us that at the present day, the degenerate children of the Nile are animated by the same feelings of worship and veneration. It was called the "Lily of the Nile," from its growing in abundance on the banks, and in the marshes which form the delta of that river. It is a stately and majestic plant, of the Nymphæ tribe, and rises about two feet above the water, having a calyx like a large tulip, and diffusing an odour like that of the lily. The wonderful physical peculiarities in the growth of this plant, rendered it an appropriate symbol in a worship of the most degrading and immoral character.

The plant grows in the water, and the blossoms are produced amongst its broad ovate leaves. In the centre of the flower is formed the seed-vessel, which is produced in the form of a bell or inverted cone, and punctuated on the top with little cavities or cells, in which the seeds grow. The seeds, when ripe, are prevented from escaping, in consequence of the orifices of the cells being too small, and so they germinate in the places where they ripen, and shoot forth into new plants, until they acquire such a degree of magnitude, as to burst the matrice open and release themselves; after which, like other aquatic plants, they take root where the current chances to deposit them. This apparently self-productive plant became the symbol of the reproductive power of all nature, and was worshipped as a symbol of the All-Creative-Power, the Spirit which "moved upon the face of the waters," and which gave life and organization to matter. We find the same symbol occurring in every part of the Northern hemisphere where symbolic religion has prevailed. The sacred images of the Tartars, Japanese, and Indians are almost all represented as resting upon the lotus leaves. The Chinese divinity, Puzza, is seated on a lotus, and the Japanese god is represented sitting on a water-lily.

VENUS'S FLY-TRAP,

Is a curiosity in another way. It is an example of a carnivorous vegetable, for the leaves are so formed that they constitute a most admirable trap, in which the plant can imprison flies for its own nutriment. Burnett, in his Essay on the "Adumbrations of a Stomach in Vegetables," says—

"It has often been objected to as an act of cruel amusement, if not of sheer malevolence, on the part of nature, to set these vegetable fly-traps, as in *Dionæa*, *Sarracenia*, *Drosera*, *&c.*, to ensnare and destroy the heedless flies, shortening their already brief existence; but observation and experiment would rather lead to the conclusion that such sacrifices of the smaller insects form no unimportant items in the food of certain plants.

"The little Sundew, which grows commonly in our bogs and marshes near London, on Hampstead-heath, &c., would itself furnish sufficient proof; I have often seen several flies and worms in the possession of one of these small plants, which was flourishing by its prowess, and fattening on the delicacies it had caught.

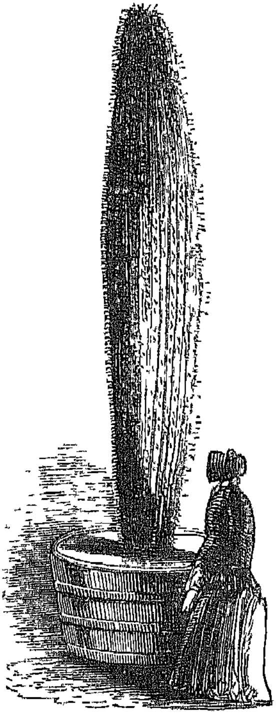
"But in the *Sarracenia* the number is still *greater*; often, in the larger plants, so great as, from their putrefaction, to cast an offensive smell around. The putrefying, however, is a necessary process; and it is, probably, both modified and checked by the sugary juices of the plants, which, like the gastric fluids of the animal stomach, may be fitted not only to digest, but also to retard or regulate the changes that take place in the food. The water in these receptacles, impregnated by the half-putrefying animal matter, doubtless affords a highly nourishing and strengthening drink to the plant; for it is well known that the drainings of dunghills give a very powerful stimulus to vegetable growth. These speculations would seem, in some measure, to admit of experimental proof; for the *Sarracenia*, if kept from the access of flies, are said to be less flourishing in their growth, than when each pouch is truly a sarcophagus; and, further, I remember to have heard, or read, of a physiological experiment made on two plants of *Dionæa Muscipula*, selected for this purpose, of nearly equal size and health; both were kept under similar circumstances, save that the one was restrained from flies, worms, and all kinds of animal food, while the other was daily fed with small strips, of rump-steaks, the result of which experiment was, that the Epicurean plant languished on its lenten diet, while the vegetable beef-eater flourished on its more substantial fare."

Few plants exhibit more traits of wonder in the details of their construction than

THE CACTUS,

Which is a plant of the fleshy kind, usually found in sterile lands between the tropics. The Cactus-tribe is, perhaps, one of the most singular of all vegetable forms. The plants composing it are leafless, and the stem, which is developed in the most varied and eccentric shapes, apparently to supply the place of foliage, presents a character little according with our ideas of a plant at all; it almost requires the splendid and fragrant blossoms of some species, to convince us that what we are contemplating belongs to the same kingdom of nature as the graceful banana or the lofty palm. The Night-blowing Cereus, the Cactus Speciosissimus and Speciosus, and many others, are the pride of horticulturists; but beauty of flower or singularity of form, alone, are never the sole attributes of plants; in the Melon Cactus, the animals of the extensive parched plains of South America find a cool, juicy refreshing food, to assuage their raging thirst. There is not, perhaps, a more striking phenomenon in natural history, than the fact of plants teeming with moisture and growing to a large size, in places where no other vegetable can withstand the burning temperature. In the deserts of the East, in Arabia, and those extensive plains where nothing save sand is seen on the ground, where the heat reflected from the earth dissipates the passing cloud, which hastens, as it were, to shed its refreshing moisture on a more grateful spot,--where no water ever rises from a spring, or falls from on high, and where the burning soil is intolerable to the foot even of the camel,—the Water melon attains the size of a foot and more in diameter; and, while all around is parched, offers in its cold and copious juice a draught to the traveller which has often saved him from a lingering and painful death.

Some of this family rise to a height of thirty feet, and rear their upright, branching, angular stems, like gigantic candelabra. Several fine specimens of this tribe may be seen in the gardens at Kew, one especially meriting attention. This is a specimen of the "Old Man Cactus," *Cactus senilis*, sixteen feet in height, and extremely healthy and flourishing. This plant is so called on account of the quantity of gray hair which crowns the summit; but which unlike the gray hair of aged manhood, becomes less



THE OLD MAN CACTUS, AT KEW GARDENS.

conspicuous the older the plant becomes; and is most plentiful during its youth. The *Cereus grandiflora*, or

NIGHT-BLOWING CACTUS,

Is an interesting member of this family, on account of the opening of its flowers during the night; each evening, during the season of blooming, it expands one of its magnificent and sweetly-scented blossoms, which it closes at the dawn of day, and never re-opens.

This beautiful specimen of the vegetable world belongs to the tribe of succulent plants, and resembles considerably the creeping Cereus so well known in England. It is a native of the West Indies, and of the warmer parts of America. The blossom of this plant is not only noted for the sweetness of its odour, but also for its size and beauty, being full six or seven inches in diameter; the blossom itself is white, surrounded by numerous leaflets of a yellow colour, proceeding from the calyx. This flower produces a fruit of an oval form, larger than a goose's egg, and covered with scales of a bright yellow colour, sometimes nearly red: its substance is fleshy, filled with very small seeds, and its flavour is agreeably acid. The stem is irregularly formed, nearly five-sided, and covered with small bristly prominences.

The whole of the succulent plants receive the greater part of their nourishment from the moisture they absorb from the air, and but little from that afforded by the earth in which they are rooted. This power of retaining their vegetative powers, was well illustrated by an experiment of Saussure's, in which a branch of a species of Cactus, which for three weeks had been the subject of numerous experiments under the rays of the sun, and in the shade, was placed in the dark, in a cupboard, without water or earth: here it remained for fourteen months, where it experienced, during the winter, cold, nearly seventeen degrees below the freezing-point, and in summer, a heat equal to seventy-eight degrees. At the end of this time, it was shrivelled up, and had lost its water of vegetation, but it had thrown out branches and roots over its whole surface, and not one portion of it had lost its vegetative power.

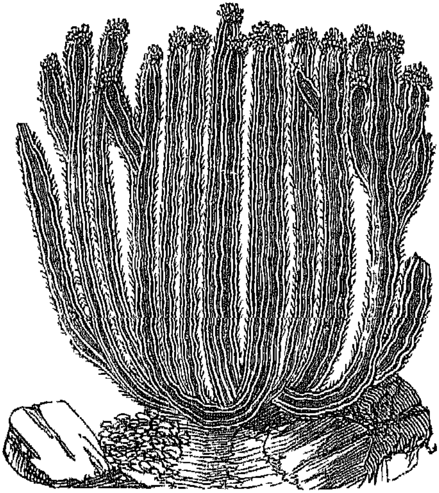
. . . "Not for thee the radiant day returns,
Oh! not for thee the golden solstice burns,
Refulgent Cerea. At the dusky hour
She seeks with pensive step the mountain bower.

Bright as the blush of rising morn, and warms
The dull cold eye of midnight with her charms.
There to the skies she lifts her pensive brows.

* * * *

Eyes the white zenith; counts the suns that roll
Their distant fires, and blaze around the pole;
Or marks where Jove directs his glittering car,
O'er heaven's blue vault, herself a brighter star.
There, as soft zephyrs sweep with passing airs
Thy snowy neck, and part thy shadowy hairs,
Sweet maid of night! to Cynthia's sober beams
Glows thy warm cheek, thy polished bosom gleams."

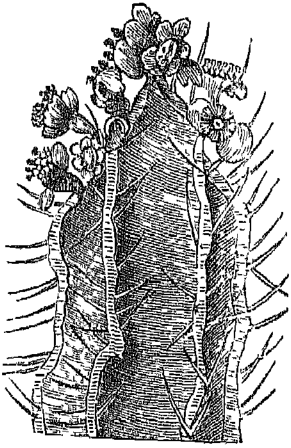
DARWIN.



THE EUPHORBIA.

Belongs to an extensive genus of plants, of which the Caper spurge may be considered the type. In the past history of the earth, the euphorbias have played an important part, and their remains are now found in great abundance in the coal measures, proving that they were important components of the forests of the carboniferous limestone. In this tribe the male and female flowers are produced distinct from each other, and all the plants are characterised by a milky juice, which becomes solid when exposed to the air. The *Sivonia hevea,* which affords the India-rubber of commerce, is a member of this tribe, as is also the box-tree, on the wood of which these pictures are engraved. The celebrated croton-oil of medicine is produced by another member of this family, castor-oil by another, and tapioca by another; so that, in a commercial as well as botanical sense, this is one of the most important classes of plants which the earth produces.

Lastly, we have to describe a few gigantic flowers, all of which are of recent discovery.



THE RAFFLESIA ARNOLDI

Was discovered in Sumatra, in 1818, when Sir Stamford Raffles, then governor of that island, made his first journey from Bencoolen into the interior. In that journey he was accompanied by a naturalist of great zeal and acquirements, the late Dr. Joseph Arnold, a member of the Linnæan Society, from whose researches, aided by the friendship and influence of the governor, in an island so favourably situated, and so imperfectly known as Sumatra, the greatest expectations had been formed. But these expectations were never to be realized, for the same letter which gave the account of the gigantic flower, brought also the intelligence of Dr. Arnold's death. This letter was one from Sir Stamford Raffles to Sir Joseph Banks, and in it he enclosed the following extract, written by the lamented Arnold to some unknown friend, (for the epistle was left unfinished,) in which he gives an account of the discovery of this, which Sir Stamford Raffles well denominated—"most magnificent flower."

After describing the previous route, Arnold says:—"At Pulo Lebban, on the Manna River, I rejoice to tell you, I met with what I consider the greatest prodigy of the vegetable world. I had ventured some way before the party, when one of the Malay servants came running to me with wonder in his eyes, and said, '*Come with me, sir, come! a* *flower very large, beautiful, wonderful!"* I went with the man about a hundred yards into the jungle, and he pointed to a flower growing close to the ground, under the bushes, which was truly astonishing. My first impulse was to cut it up and carry it to the hut: I therefore seized the Malay's parang, (a sort of instrument like a woodman's chopping-hook,) and finding that it sprang from a small root, which ran horizontally, (about as large as two fingers,) I soon detached it, and removed it to our hut. To tell you the truth, had I been alone, and had there been no witnesses, I should, I think, have been fearful of mentioning the dimensions of this flower, so much does it exceed every flower I have ever seen or heard of; but I had Sir Stamford and Lady Raffles with me, and Mr. Palsgrave, who, though equally astonished with myself, yet are able to testify as to the truth.

"The whole flower was of a very thick substance; the petals and nectary being in few places less than a quarter of an inch thick, and in some places three-quarters of an inch: the substance of it was very succulent. When I first saw it, a swarm of flies were hovering over the mouth of the nectary, and apparently laying their eggs in the substance of it. It had precisely the smell of tainted beef.

"Now for the dimensions, which are the most astonishing part of the flower. It measured *a full yard across;* the petals being twelve inches high, and a foot apart from each other. The *nectarium*, in the opinion of us all, would *hold twelve pints;* and the weight of this prodigy we calculated to be *fifteen pounds!"*

A guide from the interior of the country said that such flowers were rare, but that he had seen several, and that the natives call them *Krubul.* Later information, however, has shown that the *Krubul*, or Great flower, is much more generally known than its first European discoverers suspected. In some districts it is called *Krubul*, and in others simply *Ambun ambun.* It is said to take three months, from the first appearance of the bud, to the full expansion of the flower, and it appears but once a-year, at the conclusion of the rainy season. It has no stem of its own, but grows on the roots and stems of a woody species of *cissus, (Cissus angustifolia).* Upon this plant the *Krubul* seems to take its origin in some crack or hollow of the stem, and soon shows itself in the form of a round knob, which, when cut through, exhibits the infant flower enveloped in numerous sheaths; these open and wither away as the flower enlarges, until, at the time of its fulness, but very few remain. The blossoms rot away not long after their expansion, and the seeds (*sporæ*) are raised with the pulpy mass.

This giant flower may well be esteemed the wonder of the vegetable world; and although several others, similar to it in form and habits, have been found, none have as yet been discovered that equal it in size. A small species has been mentioned by Dr. Horsfield; but his flower, instead of measuring three feet across, only measured three inches. A second very magnificent species, measuring two feet across, has been discovered in a small island near Java, called *Nusa kambangan*, which has been described and figured by Blume, in his *Flora Javæ*. By the natives it is called *Patma*, and hence the botanical name proposed is *Rafflesia Patma*. Another of these vegetable paradoxes, figured also by Blume, is a native of the province of Buitenzorg, in the western parts of Java, and grows at the height of from 1200 to 1500 feet above the level of the sea. It has been called *Brugmansia zippelii.*

All these curious plants agree in several circumstances. In the first place, they have no proper roots of their own, and derive their nourishment from the vegetables on which they grow. In the second place, they have no stems, the flowers being seated on the vines that support them. Thirdly, they are destitute of leaves, the flowers being enclosed only by scales, which are purplish, or brownish, and resemble the outer coverings of buds, or rather the chaffy scales of other clinging plants; for, deriving their nourishment through the leaves of another vegetable, they do not require leaves of their own. So that here we have plants consisting of flower only, neither root, stem, nor leaves being present. And what is still more curious is, that, although the largest and most magnificent flowers in the world, they have very little in common with other flowering plants. They have no proper seeds, but are multiplied by *spores*, similar to the spawn of mushrooms, to which, indeed, their general form bears very great resemblance. The flower-leaves are of a mushroom-like substance, and smell like tainted beef; they contain no hollow vessels, like most other flowering plants, but consist of cells alone, like the mushroom-tribe, and they arise from beneath the bark of the cissus, which becomes enlarged by their growth, and very much resembles that false covering which some of that tribe have which grow upon living plants; raising the outer surface into tumors, and bursting it as they become more fully grown, such as the blights and blasts of corn, and so forth. Hence these stupendous flowers, which are six to nine feet in circumference, show their likeness to the most lowly of the mushroom tribes, some of which are so minute as scarcely to be visible to the naked eye.

THE VICTORIA REGIA.

This Royal Water Lily is associated with the Great Exhibition Palace in Hyde Park; since it was in constructing rapidly a house for this beautiful aquatic that Sir J. Paxton devised the principle upon which the Crystal Palace was erected. The gigantic flower (originally found in a river of British Guiana) first flowered in England at Chatsworth; and in May, 1851, a fine specimen flowered in the open air at King's Road, Chelsea, at the nursery of Messrs. Weeks A leaf of only five days' growth is five feet in diameter: "the under side presents a beautiful example of natural engineering in the cantilevers, which radiate from the centre, with large bottom flanges, and very thin middle-ribs, between each pair of which are cross-girders, to keep the ribs from buckling; their depth gradually decreasing towards the circumference of the leaf, where they also ramify." Upon this "natural engineering," Sir J. Paxton assures us that he first devised the self-supporting principle, which he applied in the roof of the great building in Hyde Park.

The largest leaves of the plant measure fourteen feet in circumference; they are able to sustain astonishing weights; a young lady placed upon one, at Chatsworth, was borne up for sometime with safety. The first flower-bud appeared at Chatsworth, Nov. 1, 1849; and a few days after Sir J. Paxton presented a leaf and flower to her Majesty and Prince Albert, at Windsor Castle.

"Here are seen
No traces of man's pomp or pride; no silks
Rustle, no jewels shine, nor envious eyes
Encounter; no fantastic carvings show
The boast of our vain race to change the form
Of Thy fair works. But thou art here—thou fill'st
The solitude. Thou art in soft winds
That run along the summits of these trees
In music.—Thou art in the cooler breath,
That from the inmost darkness of the place,
Comes scarcely felt." BRYANT.

MICROSCOPIC WONDERS.

"I tell thee that those viewless beings,
Whose mansion is the smallest particle
Of the impassive atmosphere,
Enjoy and live like man;
And the minutest throb,
That through their frame diffuses
Their slightest, faintest motion,
Is fixed, and indispensable
As the majestic laws
That rule yon rolling orbs." SHELLEY.

It would be an act of neglect on our part were we to close this book of "Wonderful Things" without some notice of the marvellous revelations of the Microscope. This instrument places us in the midst of a world before invisible, which, like a new creation, stretches away on every side, bounded only by our powers of vision, and having no limits to its extent, no terminating line in its minuteness, but such as the weakness of our instruments interpose. Turn we where we may, the microscope opens up a field of varied and exhaustless inquiry; and life, in myriad forms of wonderful development, breaks upon the scene. The drop of water from the stagnant pool becomes a world of animated beings; the fragment of chalk, or the splinter of a flint, is seen to be an aggregation of the remains of millions of creatures, which, in dying, left their skeletons to build up the walls of cities; and in the very air we breathe, these minute existences live and flourish in countless numbers, and in varieties of organization, which baffle the human intellect to classify.

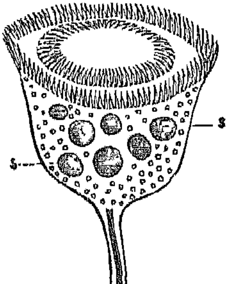
INFUSORIAL ANIMALCULES

Are among the most interesting objects revealed by the microscope. They are found in water in which vegetable substances have been allowed to decay; they are also found in the water of the ocean, and in snow and ice. The dust-like stratum we frequently notice on the surface of stagnant pools is often composed of infusoria of the most beautiful colours, and the shining, somewhat metallic film which frequently covers plants in standing water, assuming the varied hues of red, brown, yellow, green, and blue, is also made up of minute animalcules. The phosphorescence of the sea, which often lights up the ocean for many miles, and causes it to burn in the darkness, like lava fresh from a volcano's mouth, is also caused by these creatures, whose minute dead bodies, accumulated in myriads which defy arithmetical computation, make up extensive beds of solid rock, or of species still living, descend at times in showers of dust from the atmosphere, or make up those marvellous blood-like spots, which to the horror of the ignorant and superstitious, have occasionally appeared suddenly on bread and other farinaceous substances.

An important class of animalcules is that known by the term

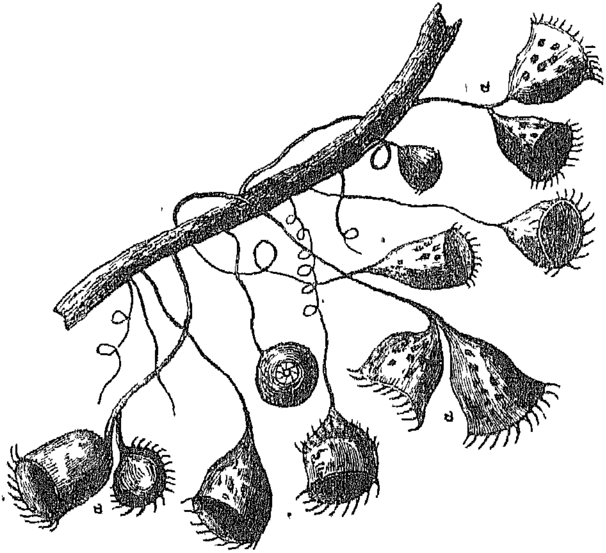
POLYGASTRICA,

so called, on account of the number of stomachs which each animalcule possesses. In addition to many stomachs, these creatures are characterised by certain hairy appendages, called cilia, which surround the mouth of the animal, and keep up a constant motion, which brings within their reach the particles of food. In this highly magnified bell-shaped animalcule, the stomachs and coronets of cilia are distinctly exhibited. The stomachs *(s)* appear in the form of circular spots, and



Bell-shaped Animalcule.

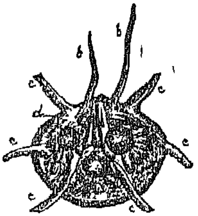
are very large in proportion to the size of the creature, and if the water is clear in which the animalcules are kept, the stomachs appear more transparent than the other parts of the animalcule.



CLUSTER OF BELL-SHAPED ANIMALCULES.

In this illustration of the bell-shaped amimalcules, wherein a number of animals are clustered together, the stomachs are denoted by the round spaces in each separate bell. The length of the body in this species, varies from 1-280th of an inch to 1-570th.

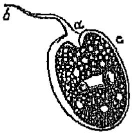
A magnified monad, increased in size 2000 times, and, of necessity, covering on this page 4,000,000 times the space it occupies in nature, will serve very well to illustrate the manner in which the cilia are attached. When the creature is examined, this delicate member eludes observation, but if it be placed in a drop of water coloured with indigo or carmine, the little whirls and currents created by the action of the cilia, are readily detected under the microscope; and upon the evaporation of the water from the glass slide



Single Monad.
b, the two cilia; c, six threads, by which it unites with others; d, the eye, which is of a bright red.

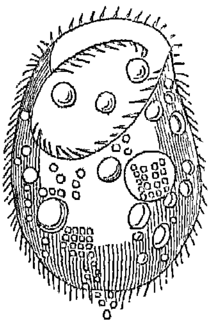
a fine streak upon the surface indicates its existence and position. In the green-eye *monad there is* only one cilium, which is as long as the body *of the creature, which is of* an egg-shaped form; it swims in the direction of its length by the continual vibration of this oar-like process.

These slender organs are variously arranged in different species of infusoria. In some, they are arranged round the mouth, as in the bell-shaped animalcule, and in this position, they serve, by *their continual motion*, to maintain a steady current, by which the creature obtains fresh water, containing air for respiration, and particles of food.



Green-eye Monad.
Magnified eight hundred times.

Another instance of the whole body being covered with cilia, is seen in the purse animalcule. Its body, which is white and round, is covered with cilia, arranged in circular rows, and the double fringes that surround the large opening, which constitutes its mouth, are longer than the rest. Its stomachs, which resemble in shape small purses, are not connected together in a chain, but are attached to the interior of the animalcule by slender stems. These infusoria are found with the dust monad and tablet animalcules, which they devour in great numbers, and in the specimen delineated, several of these creatures are seen within its body. The voracity of these beings is astonishing; they devour the smaller tribes of infusoria in vast numbers, and are perpetually engaged in the pursuit of prey. Indeed, it is so throughout all nature —the strong feeding on the weak, and often the weak feeding on the strong, and the oft-quoted verse contains much more philosophy than nonsense—

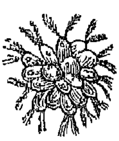


Purse Animalcule.

Fleas there are that live on men,
Whilst other fleas bite them again;
And they have other fleas that bite 'em
Thus flea bites flea, *ad infinitum!"*

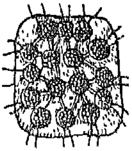
CLUSTERING ANIMALCULES

Afford curious examples of aggregation, such as we find in no other department of the animal creation. In these instances the individual life of the creature seems lost—for a group, consisting sometimes of from four or six individuals to many thousands, is found to form as it were but one creature, for the individuals composing it unite together, and so live a collective life.


Grape Monad.

In this grape monad (which is improperly named, because *monas* implies single, not aggregate, existence), the individuals are clustered together in a mass resembling grapes, with the cilia of each individual projecting outward in search of prey. This species possesses an oval form, and is furnished with two cilia at its mouth; and such is its vivacity, that, notwithstanding its minuteness, it subsists by hunting down and devouring living beings of inferior size. This animalcule increases by eggs, which become visible when magnified 800 times in linear dimensions; and also by *self-division,* which takes place both across and lengthwise of the body. In the cut they are magnified linearly 350 times; the diameter of the cluster being 1-430th part of an inch, and that of each animalcule 1-2300th of an inch.

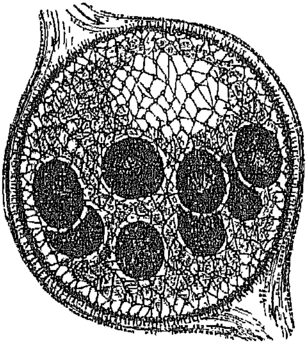
Another illustration of the community system, as seen in the social or clustering animalcule, is that of the Breastplate Animalcule, which are here seen aggregated together, and acting with the utmost harmony.


Cluster of Breast-plate Animalcules.

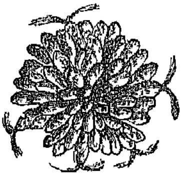
The form in which these infusoria are arranged is that from which they derive their name.

This animalcule is found in clear water, both salt and fresh. The group represented consists of sixteen globular bodies of a pure green colour, enclosed within a flat, transparent shell of a pearly hue. In this they are regularly disposed in a square or oblong four, the four centre animalcules being usually larger than the rest. Their mode of increase is by self-division; and when this occurs, the group divides across the middle in two directions, separating into four clusters, each containing four monads. No sooner has a group thus separated, than each of the animalcules which composed it increases in size, and soon subdivides into four monads, and the original number of sixteen is seen in every one of the four clusters. Ere long, these again separate into four portions, and the species multiply interminably.

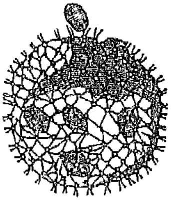
The revolving-globe animalcule was discovered by Leuwenhoeck, about a hundred and fifty years ago. It appeared to him as an animated hollow globe studded with green specks, which advanced through the fluid with a rolling motion. It was at first supposed that the globe was a single animal; but the superior microscopes of the present day have shown that this is not the case. The little green specks that gem the surface are the true animals, each being united to the mass by the cilia. The ray-globe *is of a similar construction.* Animalculæ, though so minute, are well fitted up for their aquatic life. In addition to well-formed stomachs, and active cilia, they have true muscles, which they can contract and dilate, and by which they adhere to other substances. The bell-shaped animalcule adheres to the stem of a plant by means of cord-like muscles, and



Revolving-Globe Animalcule.



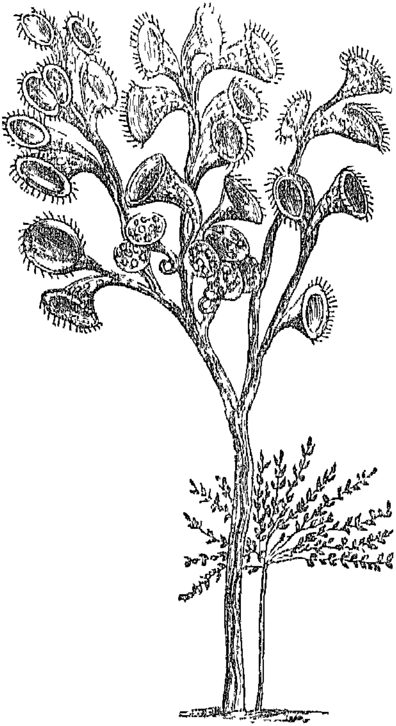
Ray-Globe Animalcule.



Revolving Globe.

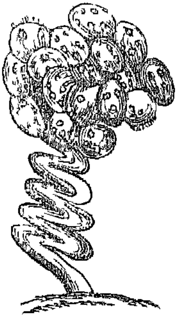
THE TRUMPET ANIMALCULE

Twines its muscular threads together, and forms a common centre, to which the members of the group can cling. In the tree-animalcule (which, in fact, is the trumpet-shaped animalcule in an earlier stage), the entire cluster springs from a single trunk, which, dividing and sub-dividing into numerous branches, puts forth its trumpet-shaped living blossoms at the extremity of every bough.



THE TRUMPET ANIMALCULE.

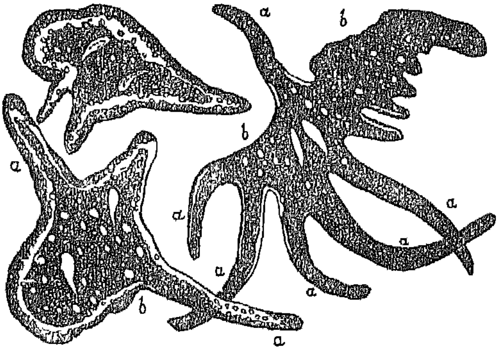
This mode of union is the result of imperfect self-division; a single animalcule first separating itself into two that are united by a forked stem, and these again into four, which still remain connected; thus the division proceeds, until the limit of development is attained, and a graceful branching cluster rises from a common stalk. A muscle is distinctly seen rising from the root, traversing the trunk, and extending its minute ramifications to every member of the group. Not only is each individual endowed with the power of coiling and uncoiling its own stalk, by the aid of this muscle, independently of the action of its fellows, as shown in the cut, but the whole group can suddenly contract its dimensions, the main trunk folding closely together in spiral wreaths, and the spreading tree shrinking into a globular mass, while each animalcule assumes a spherical shape, and its crown of cilia occupies a narrower circle. The natural size of a single animalcule, ranges from *one-four hundred and thirtieth of an inch* to *one-five hundred and seventieth.*



Tree Animalcules.

THE PROTEUS

Is a very remarkable creature, endowed with the power of repeatedly changing its form. It appears, under high powers, as a yellowish jelly-like mass, and in its normal shape is globular. It is, however, but seldom seen in the globular form, and changes its shape frequently while under inspection. From this circumstance, it is termed Proteus, the name of the wondrous sea-god, who could assume, at will, every form, turning himself into animals, trees, fire, and water. This is the god whom, according to the classic fables, Virgil describes as assuming innumerable shapes—



THE PROTEUS.

"With foamy tusks, will seem a bristly boar,
Or imitate the lion's angry roar;

> Break out in crackling flames, to shun thy snares,
> Or hiss a dragon, or a tiger stares;
> Or, with a wile thy caution to betray,
> In fleeting streams attempt to slide away;
> Will weary all his miracles of lies,
> Till, having shifted every form to shape,
> Convinced of conquest, he resumes his shape."

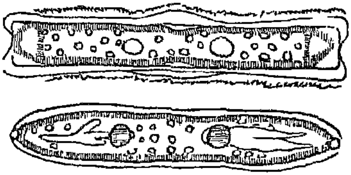
From its body it projects numerous processes; and the projections so instantaneously formed are also filled up by a portion of the internal part, which is forced into it as it expands, just as if from the human chest another arm were immediately to protrude, and a portion of the heart and lungs were forced into it, as if naturally fixed and growing there. These extemporaneous limbs or feelers (*a*, *a*, *a*,) the Proteus can withdraw into its body, and immediately protrude others *from a different place*; in each instance a portion of the intestine being forced into the extended limb, as seen in the cuts. The numerous stomachs are represented by the dots *b*, *b*, *b*.

THE LORICATED INFUSORIA

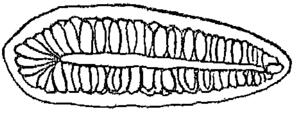
Rust-like Gallionella.

are different from those already described, inasmuch as that their bodies are encased in flinty shells. The annexed cut shows several delicate and branching chains, composed of these little beings, which, *from the resemblance of their* colour to iron-rust, have received the name of *Rust-like Gallionella.* Each of these infusoria is invested with a flinty shell, of an oval shape, rounded at both ends, and smooth on the surface. They are found in most of the waters impregnated with iron, and also in peat-water, which contains a little of this mineral.

There is another kind of infusoria belonging to the Bacillaria, which is shaped like a boat or ship, and from this resemblance has received the name of Navicula, which in the Latin language signifies a *little ship.* They are never united like the Gallionella, in chains; but exist singly and in pairs, enclosed in a durable, thin, siliceous shell, generally four-sided, and which, when slightly pressed, divides either into two or four parts, disclosing the appearance of ribs running across it. A jelly-like substance, which constitutes the body of the animal, occupies the interior of the shell. and portions of matter, of a green, yellow, and brown colour, are here perceived, which have been regarded by naturalists as eggs of the Navicula.

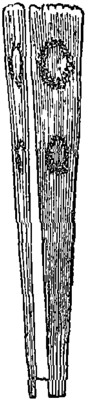


Green Navicula.

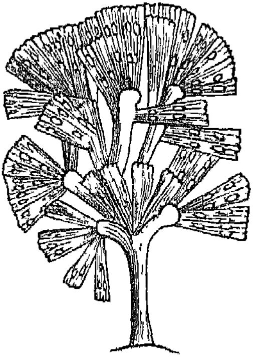


Golden Navicula.

A species of infusoria belonging to the family of the Bacillaria, and bearing the name of Palm, or Fan-shaped Animalcule, is shown in the figure. These animalcules are encased in a shell which is broad and wedge-shaped, and form a fan-like cluster, rising from a single trunk or stalk. The stalk is produced by an excretion of the animalcule, and is not possessed of any vital power; *for if the branching, living groups are broken off, no fresh buds, teeming with animal life, are put forth from the mutilated trunk, but it soon crumbles away and utterly perishes.* The natural size of the cluster varies from *one-twelfth to one sixth* of an inch—

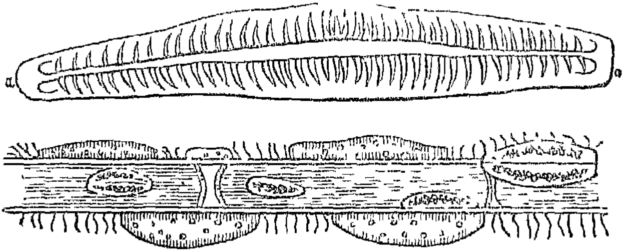


Fan-shaped Animalcule.

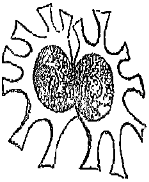


Palm-shaped Animalcule.

that of a single specimen is *one-hundred and twentieth of an inch.* Other remarkable examples of this kind are the Eunotia and the Xanthidia.



The Swollen Eunotia.



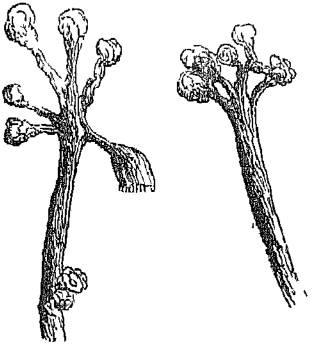
Xanthidia, or Forked-bar.

Spinous Xanthidia.

There is nothing more wonderful in the world than the rapid multiplication of these creatures. Some multiply by eggs, some by divisions of the body, and one, the *monas vivipara,* produces its young alive. Ehrenberg kept a rotatorial animalcule in a vessel of water for eighteen days, and in the course of that time, it laid four eggs a-day, and the young, when two days old, laid the same number; so that, continuing to multiply at this rate, it was found that in ten days the offspring of this single individual would amount to one million, and in twelve days, to sixteen millions. But the box-chain animalcule increases even more rapidly. A single individual of this kind can, in the space of four days, give origin to no less than one hundred and forty billions of beings; and as, from the size of the bodies, we can easily

MONAS VIVIPARA.

calculate that forty thousand millions of individuals exist in a cubic inch of the polishing slate of Bilin, so seventy billions must be necessary to form a cubic foot of the same structure! Four days only for the production of one hundred and forty billions separate and perfect creatures from a single parent each one provided with its own shell, members for locomotion, digestive apparatus, and individual sensibilities—a living atom perfect as a world.

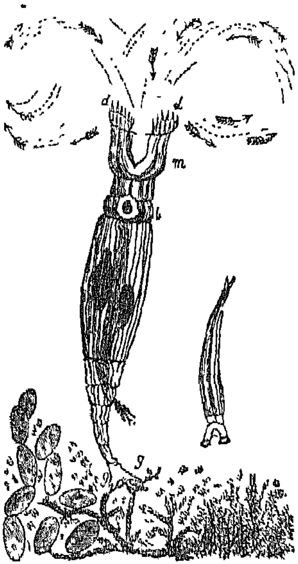

Reproduction of Bell-shaped Animalcules.

There is no process more interesting than the repeated self-division of the bell-shaped infusoria. The figures exhibit a complete specimen with several globular buds emanating from it; and stems covered with buds in a state of progress towards completion. The last illustration, obtained by means of one of Mr. George Cox's microscopes, shows the curious way in which these buds are developed. In the course of a few hours, and sometimes, indeed, while we are watching one of these stems, several of the medlar-shaped ova detach themselves and go off as free animals, and after settling on some locality near, it undergoes a slight agitation of the cilia, and expands into a perfect cup.

THE ROTATORIA

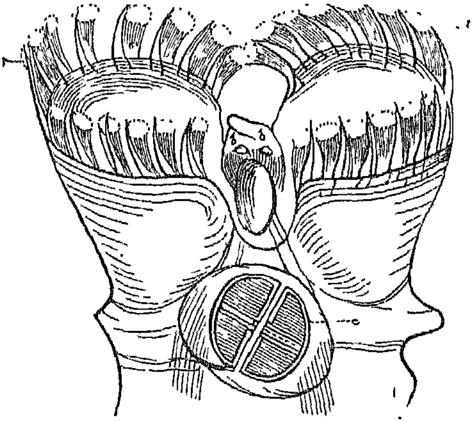
Is another division of infusorial animalcules, so called on account of the peculiar arrangement of the cilia, which, when in motion, have the appearance of a rotating wheel.

The most remarkable fact, however, in reference to the outward covering of the rotatoria, is that of the division of the body into segments, which slide upon each other like the tubes of a telescope. Under the microscope, the muscular development is very plainly seen, and a very curious appendage startles us in connection with it. This is, by some, considered the tail of the animal; but as it is attached to the anterior portion of the body, it cannot be so considered, but is rather a kind of foot, destitute of joints, but very strange withal in the fashion of its construction. "It has usually the *faculty* of being able to slide one part within another, and recalls to the observer the movement of the sliding tubes of an opera-glass or telescope. Its extremity is often so formed, that the creature can cause itself to adhere to any substance, by probably producing an exhausted cavity within the disc-like extremity, as do the leech and some parasitic acari found on beetles. Sometimes the termination of this false foot has two or more toe-like processes. By the construction of this member, the creature is enabled to attach itself, while the *anterior* part is moving about in search of provender, and likewise to employ it as an instrument of progression, by alternately contracting and elongating it, and fixing itself by it and the mouth, after the manner of a leech. Muscles for moving the body and the rotary organs, are mostly visible; they are known by their thickening during contraction, and by dilating when elongated.



WHEEL-SHAPED ANIMALCULE

The wheel-like organs are seen at *d d*, surmounting the head of the creature, and are each furnished with circles of cilia, apparently in constant rotation; causing currents, as shown by the arrows, to set towards the opening between the wheel, bearing along the particles of matter upon which they feed. From this opening the food is carried through the neck, *m* (the position of which is indicated by a dark line), to the mouth, *l*, situated at the bottom of the neck. The wheel-animalcule moves through the water by two different methods.



WHEEL ANIMALCULE.

a a. The Cilia. *b b.* The Eyes. *c.* The Jaws and Teeth

The first is by *swimming*, which is accomplished by the rotatory action of its crowns of cilia; and in the second method the tail is employed.

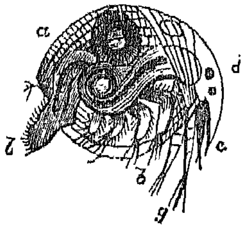
THE SMALLEST ANIMAL IN THE WORLD

Twilight Monad

Is the minute twilight monad, here represented as seen under the highest powers of the microscope. Each creature, although exhibited as a mere point, is magnified in length and breadth eight hundred times, and the space it occupies upon the paper is six hundred and forty thousand times greater than that which it actually covered in the fluid in which it lived. This animalcule is globular in form, and presents a glassy appearance. It is found in water containing animal matter, upon which it feeds; but as the animal substance decomposes, the monads die, and colourless jelly-like masses, consisting of infinite multitudes of their bodies, are seen with the naked eye.

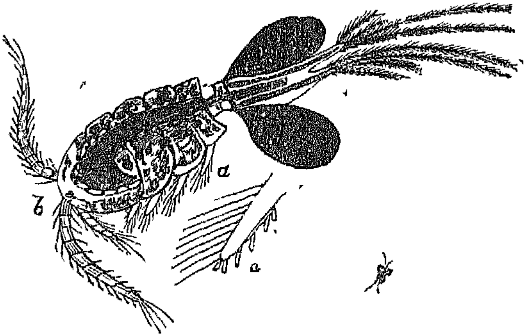
> "Full nature swarms with life; one wondrous mass
> Of animals, or atoms organized,
> Waiting the vital breath when parent-heaven
> Shall bid his spirit blow. The hoary fen,
> In putrid streams, emits the living cloud
> Of pestilence. Through subterranean cells,
> Where searching sunbeams scarce can find a way,
> Earth animated heaves—and where the pool
> Stands mantled o'er with green, invisible,
> Amid the floating verdure millions stray.
> Each liquid too, whether it pierces, soothes,
> Inflames, refreshes, or exalts the taste,
> With various forms abounds. Nor is the stream
> Of purest crystal, nor the lucid air,
> Though one transparent vacancy it seems,
> Void of their unseen people."
>
> THOMSON.

Turning to other scenes in the microscopic world, wonder still attends us as we discover other forms of minute existence, larger by many thousand times than those just described, yet sufficiently minute to need the piercing vision of the microscope *to reveal their forms distinctly.*



THE MONOCULUS

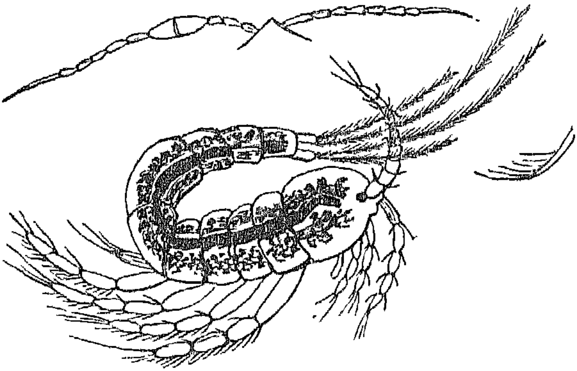
Is a creature well known to the frequenters of the Polytechnic Institution, at which place much diversion is caused by the droll movements of this creature, when exhibited by the oxy-hydrogen microscope. When thrown on the screen it is seen to dart hither and thither with the most comical contortions, twirling, sidling, and trembling, and making the most spasmodic of starts and the most complicated of spiral movements. In the cut, *a* is the reticulated shell, which is covered with delicate mosaic work; *b* is the edge of the shell, where the animal opens it; *e* is the beak; *d* the two eyes, of different sizes; *g* the two horns or feelers; and *l* the fin which assists in causing the revolving motion peculiar to the creature.



THE WATER-FLEA (MAGNIFIED, AND NATURAL SIZE)

Is found abundantly in ponds and brooks during the summer months, where it sports with its fellows very actively. The body of this creature is covered with a kind of armour, formed of plates of shell that overlap each other. On the underside these plates do not meet, and they thus afford space for the respiratory organs, which are seen at *a*, but more distinctly at *c*, which exhibits them more highly magnified. The eye is delineated at *b*: it is of a dark crimson hue, and from each side of it there spring two horns or feelers. The appendages which are seen attached to the lower extremity of the animal are the bags containing its eggs, and which are, together, nearly equal in size to the bulk of the insect itself. Below these sacks the tail is forked and adorned with a plume of fringed hair. In most instances the shell of the water-flea is transparent like crystal, but it is frequently embellished with beautiful tints. Some are of a bluish green, and others red, with the receptacles of the eggs of a green colour. In the specimen from which the drawing was taken the shell was richly adorned with bright red hues.

Horns of the Water-flea.

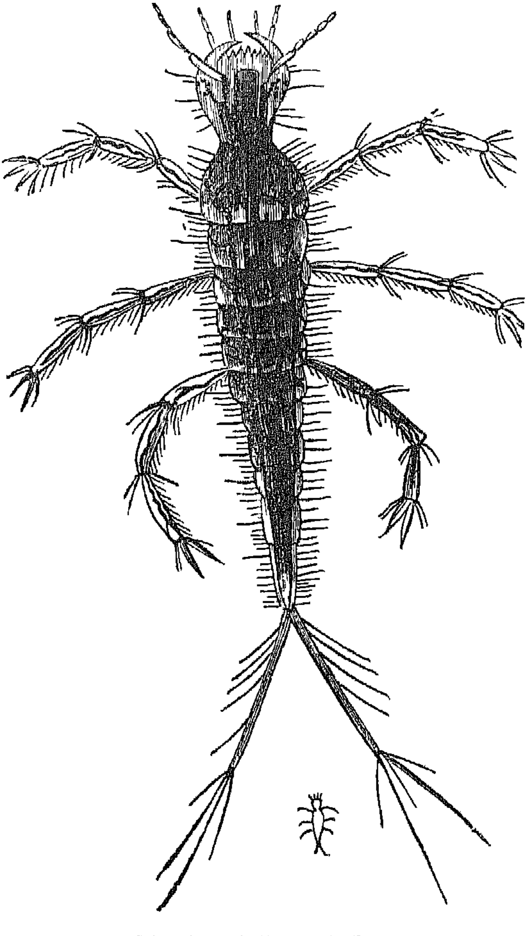


THE VAULTER

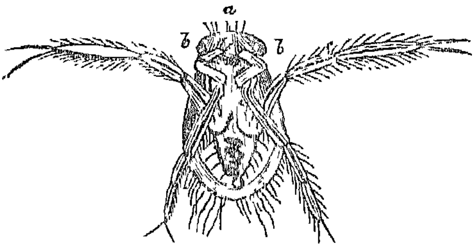
Is another of the small aquatic insects, noted for its jumping propensities. As a person approaches, it remains quiet for a short time upon the leaves of the plant on which it happens to be; but soon springs away to some other place, a motion which it effects by bending its body and darting away from point to point, by the force of the recoil. In England, the vaulter appears in the greatest numbers in the months of April and May, swarming upon the stalks and under side of the leaves of healthy duck-weed, growing on the surface of the water. Stagnant water, filled with decayed plants, is destructive to them, and in order to preserve them, they must be provided with plenty of clear, pure water. The vaulter is very active, and when caught, is usually detected in the eager pursuit of his prey.

THE BOAT-FLY

Is a strange little creature, which haunts the ponds and streams during spring, where he delights himself in certain aquatic exercises, spending the greater portion of his life in swimming on his back, from which diversion he sometimes seeks a change in diving—not after pearls, but to fish up the slimy food which he finds in the muddy bottom. When perfect, it has a carmine tint. The head, *a*, is of a yellow colour, and on each side are



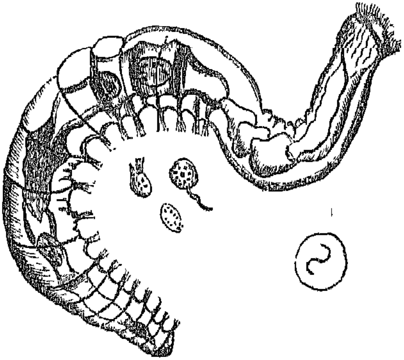
LARVA OF WATER-BEETLE.



THE BOAT-FLY.

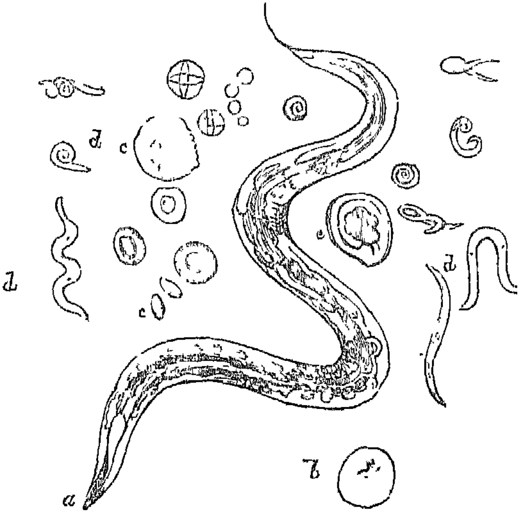
two reticulated eyes, *b b*, of a deep crimson hue. It has three pairs of feet, fringed with hair; the first of which often escape observation from their colour and position. The second pair are generally thrown forward in a swimming position, as displayed in the figure. The hinder pair are the strongest, and are armed at their extremities with claws. The beak is hard and pointed, and in some of the larger species is capable of inflicting a severe puncture.

Another aquatic animal, possessing strange characteristics, is



THE LURCO, OR GLUTTON,

Which is one of the best objects for the microscope, and does not require a high power for the study of its structure. Its body is beautifully transparent, and the prey, which it swallows alive, may be seen writhing in its stomach. The body is fringed all along with hairs, and numerous hairs surround the mouth. The creature is little else than an assemblage of stomachs, and these are always so busily employed in digesting the monoculi which it swallows, that its name of glutton is by no means unsuitable. The lurco may be caught in abundance in most waters which contain grass or weeds, and may be kept for many months in vessels of water, if fed with monoculi.



THE EELS IN PASTE

Are aquatic animals of another order, and have little in common. Not the slightest indication of life can be found in the paste when freshly made; indeed, the heat to which it has been subjected in boiling would inevitably destroy any previous vitality; and yet but a short time elapses ere it swarms with countless living forms, whose existence, under ordinary circumstances, terminates only with the entire consumption of the paste upon which they feed. Adams, in his work on the Microscope, remarks, that there are *four* kinds of eels found in paste; that during the fall and winter they are *oviparous*, and the young eels may then be perceived proceeding from the eggs; but at other times they are *viviparous*. The chief figure in the drawing is a magnified view of a full grown eel of the first kind. The position of the mouth is denoted by the letter *a*, and so perfectly distinct is this organ, that under the microscope it can be seen in motion as the animal feeds upon the paste; *c*, *c*, and *c*, are light-brown particles of matter, which are found in the interior of the animal; *d*, *d*, *d*, &c., are young eels in the same situation.

When a full grown eel is cut in two, the young eels and the brown particles are at once expelled. The result of such a dissection is shown in the group around the central eel, where the individuals are magnified to the same extent as the parent animal. The smaller eels, found on the surface of the paste, and which have not arrived at maturity, exhibit the same appearance as the specimens composing this group, and display no internal organization, which only becomes apparent as they advance in size. So prolific is this animal, that it often contains, when mature, a hundred living eels at one time.

Now, kind Reader, we bid you farewell. We have carried you through all the regions of the marvellous, and have shown you the wonders, living and dead, which the world enshrines. The crumbling stone, the blooming flower, the song-bird—a spoken joy; and the rocky cavern—a dumb sadness; the deep sea with its pearly grottos and mysterious darkness, and the embracing air with its fleecy cloud, its rainbow, and its deep thunder, have each and all told their story of wonder for our instruction and delight.

J. & W. Rider, Printers, Bartholomew Close, London